

# ▲▲ THE IRON AGE ▲▲ September 7, 1933 ▲▲

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## STEEL - SERVICE

# THE IRON AGE

SEPTEMBER 7, 1933

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## Will Uncle Sam Move Out —Or Unionize?

"It would be indeed helpful in this time if persons who are mentally unable to accept the necessity and value of having genuine and responsible labor organizations for the self-protection of labor interests and the stabilization of industry would emigrate to some backward country where there are no free schools and where the level of common intelligence is very low and would cease to clutter up progress in the United States with the rubbish of outworn ideas and dead philosophies."

*Donald Richberg, in radio address "Freedom and Security Under NRA," Aug. 29. Mr. Richberg is general counsel of the Recovery Administration.*

**I**S Uncle Sam going to permit the unionization of all Government departments? Is he willing to arrange the pay rates and hours of Government employees through collective bargaining?

Will he deal as to these matters and with working conditions with any representative that the majority of his workers may choose, even if this person has no connection with

Government work and entertains antagonistic viewpoints?

Will Uncle Sam instruct the United States Treasurer to deduct union dues from the pay checks of all Government employees and divide these amounts among the professional labor leaders?

Will he tolerate strikes, picketing and interruption of Government service because of impossible labor demands?

Will he abolish the civil service examination as a medium of choosing employees and substitute the union card for it?

If Mr. Richberg's interpretation of the Administration's intent is correct, Uncle Sam must do these things at once, or move to some backward country. For he cannot force upon private employers a policy that he is himself unwilling to accept.

# Chromium Steels Improved by

**A**FTER many investigations it has been generally accepted that nitrogen, when present in more than certain amounts, produces harmful effects in iron and ordinary steel. For example, the work of Tschischewski<sup>1</sup> and Dean<sup>2</sup> has indicated that nitrogen is detrimental to iron and steel, while Scott<sup>3</sup> claims that nitrogen increases the strength and hardness and decreases the ductility and toughness of open-hearth steels. Little has been published relating to the effect of nitrogen on the characteristics of the more highly alloyed steels of the high-chromium type. In 1926 Adcock<sup>4</sup> published the results of a carefully conducted investigation on the influence of nitrogen in chromium and some chromium-iron alloys. These high-chromium steels are known commercially as corrosion-resisting and heat-resisting metals. They have many excellent properties but, as in the case of all metals, there is an opportunity for certain improvements.

In the cast condition, steels containing relatively high percentages of chromium have structures consisting of large crystals, sometimes arranged in columnar form, but in many instances in arrangement less regular. Castings having such large grains frequently show porosity under hydraulic testing. Frequently these large grains give difficulty on hot working, and even though the operation may be successful, their effect may persist in the finished forging.

## One Part Nitrogen to 100 Parts Chromium

After considerable search for an agent which in small amount would

By **RUSSELL FRANKS**

Union Carbide and Carbon Research Laboratories, Inc., Long Island City, N. Y.

refine the grain of these steels, nitrogen proved to be the most desirable from several points of view. Approximately one part of nitrogen to one hundred parts of chromium is sufficient for this purpose. When present to this extent the nitrogen is uniformly alloyed in the steel as a nitride, and solid metal is readily obtainable. If an attempt be made to introduce much more nitrogen into high-chromium steels, the nitrides tend to decompose and the metal is likely to contain blowholes.

The nitrogen can be conveniently added in the form of high-nitrogen ferrochromium having the desired ratio of chromium to nitrogen. If ferrochromium of this kind is used, sound steel can be secured by electric furnace manufacture according to the usual processes. One word of precaution: The high-nitrogen ferrochromium should not be added to excessively hot steel, as this tends to cause decomposition of the nitrides, resulting in liberation of gaseous nitrogen. When properly added, practically all the nitrogen will remain in the finished steel, and the metal may be remelted without appreciable loss of this element.

## Nitrogen Effective in High-Chromium Steels

Nitrogen has proved particularly effective in reducing the grain size

and improving the physical properties of cast steels containing 20 per cent or more chromium. While nitrogen is effective in improving the strength and toughness of steels containing even 30 per cent chromium or more, it is advantageous to have the chromium approximate 25 per cent in order to obtain comparatively strong and tough castings with good resistance to heat and corrosion. Castings of such steels have the properties shown in Table I.

The analyses given in the table show



**S**TRUCTURE of a steel containing 18.25 per cent chromium, 8.71 per cent nickel, 0.18 per cent carbon, and 0.20 per cent nitrogen in the hot rolled condition—100 diameters.

that some of the steels contain relatively small amounts of nickel, which were included for two reasons. First, if a considerable proportion of high-chromium steel scrap is constantly used, nickel will in time accumulate in

TABLE I—TESTS ON HIGH-NITROGEN CHROMIUM STEEL CASTINGS

Per Cent				Heat Treatment	Yield Point Lb. per Sq. In.	Max. Stress Lb. per Sq. In.	Elong. in 2 In., Per Cent	Transverse Test*		Brinell Hardness
Cr.	C	N <sub>2</sub>	Ni					Breaking Load, Lb.	Deflection, In.	
24.21	0.32	0.20	0.15	As cast.....	63,000	82,000	3	7,800	0.30	202
24.21	0.32	0.20	0.15	Heated at 850 deg. C. 2 hr., furnace cooled to 600 deg. C. and air cooled.....	52,200	81,400	15	.....	...	179
24.43	0.35	0.26	1.20	As cast.....	76,600	96,500	3	8,700	0.53	223
24.43	0.35	0.26	1.20	Heated at 850 deg. C. 2 hr., furnace cooled to 600 deg. C. and water quenched.....	61,000	103,000	6	.....	...	200
24.85	0.42	0.22	1.51	As cast.....	.....	.....	..	9,700	0.60	223
25.97	0.32	0.30	1.13	Heated at 850 deg. C. 2 hr., furnace cooled to 600 deg. C. and water quenched.....	62,700	106,400	7	.....	...	207
27.35	0.56	0.32	0.34	As cast.....	50,000	75,000	2	6,800	0.23	196

\*1 1/4 in. diam. tapered bar loaded in the middle, 12 in. between centers.

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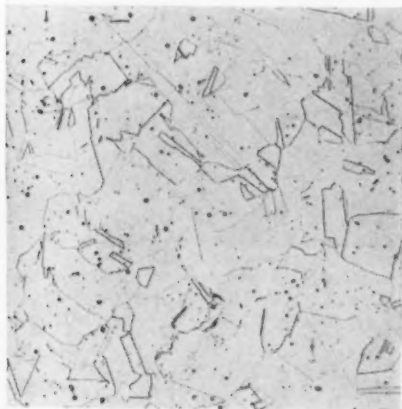
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the castings; secondly, a small quantity of nickel in the presence of nitrogen gives some added strength.

The tensile tests show that the high-nitrogen cast steels are strong and comparatively ductile. A similar statement can be made with respect to the transverse strength, and it is apparent that the steels are fairly tough, as shown by the extent to which bending occurs before fracture. These properties are accompanied by a slight increase in hardness, but this does not impair the machinability.

Successful commercial heats have proved the desirability of high nitrogen content in these steels, particularly in the production of castings highly susceptible to cracking, such as pump impeller parts having great differences in cross-section. Difficulties have been encountered in the production of such castings from steels con-



**STRUCTURE** of the same steel after heating at 1150 deg. C. 5 min. and water quenching—100 diameters.

taining more than 20 per cent chromium and normally low in nitrogen.

## Reduces Grain Size

The high-nitrogen cast steels are as resistant to oxidizing media as the low-nitrogen steels. Increasing the nitrogen content does not affect the resistance of the steels to oxidation at elevated temperatures, and there is experimental evidence that the fine-grained castings resist the grain growth that occurs at the higher temperatures.

The addition of nitrogen to cast steels containing about 18 per cent chromium produces some refinement in grain structure, but the improvement is not so marked because the steels lower in chromium have a grain

**NITROGEN**, when uniformly alloyed in the chromium and the chromium-nickel steels, and in amounts of the order of 0.20 to 0.30 per cent, has been found to impart such beneficial effects that a broadening of the use of these steels is regarded as the natural outcome. The researches bearing on the subject have now become available through the accompanying article.

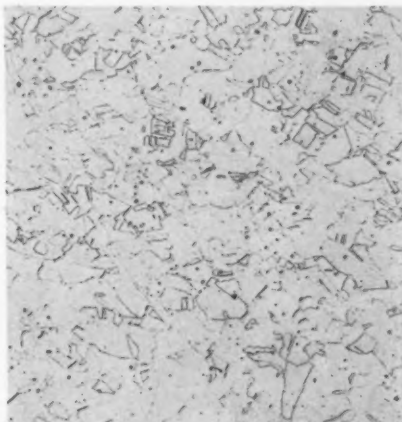
Castings and also the wrought steels, including those of the stainless class, respond to the beneficiation of the nitrogen. In the case of the high-chromium alloy castings, a product is obtained that withstands abuse without cracking, suggesting its application in pump impeller parts having great differences in cross-section. In the case of the chromium-nickel steels, the introduction of the nitrogen improves machinability and provides non-magnetic castings of relatively high strength. In all the low carbon classes of these alloys, considerable ductility and toughness is added and a non-magnetic wrought material of high yield point, machinability and resistance to staining is obtained. The nitrogen is added in the form of high-nitrogen ferrochromium, as explained in the early passages of the article.

initially smaller than metal containing 20 per cent chromium or more.

The accompanying photographs show fractures of commercially produced high and low nitrogen chromium steels. They illustrate the effect of nitrogen in reducing the grain size in castings of such steels.

## Improves High-Chromium Wrought Steels

Nitrogen has been added to steels of even lower carbon content containing chromium below and above 20 per cent, and sound ingots have been obtained without difficulty. They are readily forged and rolled at temperatures in the neighborhood of 1100 to 1200 deg. C. Table II gives the results of tests conducted on wrought chromium steels high in nitrogen. These show that the steels are strong



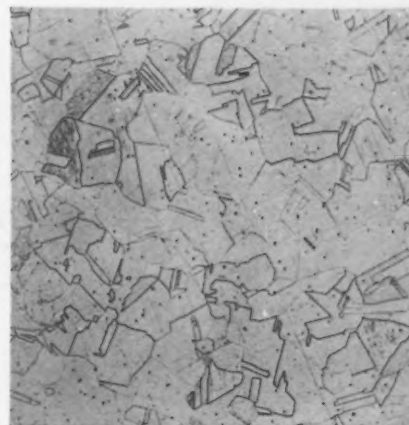
**STRUCTURE** of a steel containing 18.13 per cent chromium, 8.67 per cent nickel, 0.075 per cent carbon and 0.21 per cent nitrogen in the hot rolled condition—100 diameters.

and ductile. The high-nitrogen 18 per cent chromium steel is especially strong, although slightly harder than those higher in chromium. The structure of the wrought high-nitrogen steels consists of small grains,

showing that nitrogen is effective also in reducing grain size in the low-carbon high-chromium steels. This takes place without producing a marked increase in hardness, which is a recognized advantage. The high nitrogen content of these wrought steels does not diminish their resistance to staining.

Another interesting effect of nitrogen is its tendency to retard the development of brittleness in the low-carbon steels containing over 20 per cent chromium. Wrought steels containing more than about 20 per cent chromium and high in nitrogen will become brittle between 400 and 500 deg. C., but a longer time is required to develop brittleness than with the low-nitrogen steels. The explanation may be that the nitrogen is in combination with chromium. If so, the solid solution thus depleted of chromium would be more slowly affected at these temperatures.

Additions of nitrogen to high-chromium steels containing substantial amounts of nickel have yielded interesting results. As with the plain chromium steels, nitrogen can be in-



**STRUCTURE** of the same steel after heating at 1150 deg. C. 5 min. and water quenching—100 diameters.

TABLE II—TESTS ON WROUGHT HIGH-NITROGEN PLAIN CHROMIUM STEELS

Per Cent			Heat Treatment	Yield Point	Max. Stress	Elong. in 2 In.,	Red. of Area,	Brinell
Cr	C	N <sub>2</sub>		Lb. per Sq. In.		Per Cent	Per Cent	Hardness
19.37	0.10	0.28	Held 6 hr. at 760 deg. C. and air cooled. ....	56,000	100,000	27	56	163
22.67	0.11	0.27	Held 10 hr. at 875 deg. C. and water quenched	51,400	90,250	26	57	149
26.08	0.12	0.28	Held 10 hr. at 875 deg. C. and water quenched	60,000	87,200	27	59	153

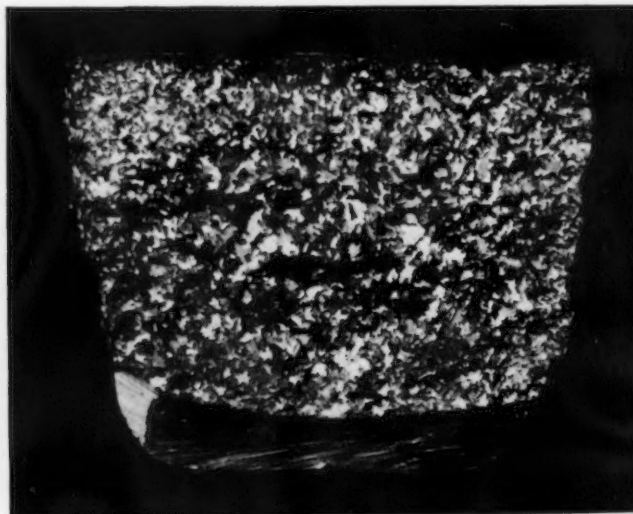
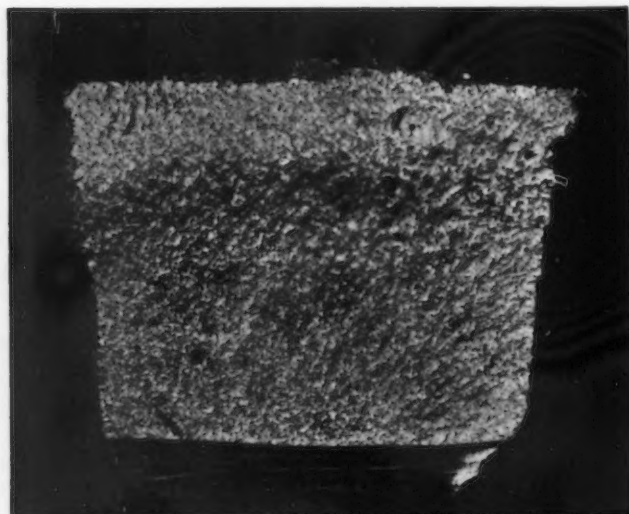
roduced in the form of high-nitrogen ferrochromium. For both steels the same melting practice would in general be employed.

The results of physical tests on castings of several high-nitrogen chromium-nickel steels are given in Table III. Considering that these steels are austenitic their strength is exceptionally high. They are ductile and tough, and the machinability is

nickel type are shown in Table IV. Attention is drawn to the extremely high yield points which these wrought high-nitrogen chromium-nickel steels possess in the hot-rolled condition, accompanied by considerable ductility and toughness. Water quenching from 1150 deg. C. increases the ductility, toughness and softness, with a lowering of yield point but less of ultimate strength. These steels are easier to

for about 2 hr., followed by air cooling, renders them even more adaptable to machining operations. It seems almost unnecessary to state that some important requirements may be met by such a high yield point, non-magnetic steel of the stainless type which can be wrought and machined.

Photomicrographs of low and medium carbon 18 per cent chromium and 8 per cent nickel steels having high



THE difference in the grain of the steel having the higher nitrogen content is shown in these two pictures of the fractures of cast steel. That at the left is a cast steel containing 27.35 per cent chromium, 0.56 per cent carbon, 0.34 per cent nickel and 0.32 per cent nitrogen. The fracture at the right is of a cast steel containing 27.85 per cent chromium, 0.50 per cent carbon, 0.75 per cent nickel and 0.06 per cent nitrogen.

somewhat improved as a result of the nitrogen addition.

#### High-Nitrogen 18 and 8 Steels

The physical properties of high-nitrogen steels of the well-known 18 per cent chromium and 8 per cent

machine both in the hot-rolled condition and after annealing at 1150 deg. C. than the 18 per cent chromium and 8 per cent nickel steels of the usual type. This includes threading, drilling and turning. Heating the high-nitrogen steels at 700 to 800 deg. C.

nitrogen content are here reproduced. Examination reveals that practically all nitrogen is in solid solution. The steels consist of relatively small grains which do not greatly increase in size by heat treatment at temperatures as high as 1150 deg. C.

TABLE III—TESTS ON HIGH-NITROGEN CHROMIUM-NICKEL STEEL CASTINGS

Per Cent				Heat Treatment	Yield Point	Max. Stress	Elong. in 2 In.,	Izod Impact	Transverse Tests*		Brinell
Cr	Ni	C	N <sub>2</sub>		Lb. per Sq. In.		Per Cent	Ft.-Lb.	Breaking Load, Lb.	Deflection, In.	Hardness
17.94	9.04	0.27	0.19	As cast. ....	44,500	88,000	40	96	8,000	3.00	163
17.94	9.04	0.27	0.19	Heated 10 min. at 1050 deg. C. and air cooled. ....	46,000	90,000	36	97	.....	...	179
22.58	11.47	0.23	0.25	As cast. ....	45,000	83,500	32	66	8,350	2.40	170
22.58	11.47	0.23	0.25	Heated 10 min. at 1050 deg. C. and air cooled. ....	45,500	90,000	33	80	.....	...	170
17.33	34.42	0.26	0.12	As cast. ....	37,000	68,500	11	16	7,500	1.00	163
17.33	34.42	0.26	0.12	Heated 10 min. at 1050 deg. C. and air cooled. ....	39,500	85,000	16	26	.....	...	170

\*1¼ in. diam. tapered bar loaded in the middle. 12 in. between centers.

TABLE IV—TESTS ON HIGH-NITROGEN CHROMIUM-NICKEL STEELS

Per Cent				Heat Treatment	Yield	Max.	Elong.	Red.	Izod	Brinell
Cr	Ni	C	N <sub>2</sub>		Point	Stress	in 2 In.,	of Area,	Impact,	
					Lb. per Sq. In.		Per Cent	Per Cent	Ft.-Lb.	Hardness
18.25	8.71	0.18	0.20	As hot rolled.....	89,000	121,000	37	53	39	235
18.25	8.71	0.18	0.20	Quenched from 1150 deg. C....	48,000	107,000	56	67	100	159
18.25	8.71	0.18	0.20	Held 2 hr. at 750 deg. C. and air cooled.....	80,000	124,000	36	46	72	207
18.13	8.67	0.075	0.21	As hot rolled.....	82,000	113,000	38	60	38	217
18.13	8.67	0.075	0.21	Quenched from 1150 deg. C....	48,500	99,500	53	70	120	149
18.13	8.67	0.075	0.21	Held 2 hr. at 750 deg. C. and air cooled.....	80,600	117,000	38	60	82	207

The fact that practically all the nitrogen is in solid solution partly explains why stainlessness of the steels is not noticeably diminished by its presence. Samples have remained unaffected in the salt spray atmosphere for comparatively long periods. This is equally true of samples exposed to the normal atmosphere, clearly showing that under these conditions the metal has excellent resistance.

Nitrogen has one important detrimental effect on the properties of the wrought chromium-nickel steels. Decreased stability is exhibited at elevated temperatures. If the high-nitrogen steels are held for relatively long periods at temperatures between about 600 and 900 deg. C., they suffer a greater decrease in toughness than metal having the same percentage of

ity or toughness, but the decrease in grain size is not so marked as that resulting from the addition of nitrogen to the plain chromium steels. The introduction of nitrogen to the chromium-nickel steels improves the machinability and provides non-magnetic castings having relatively high strength.

The low-carbon, high-nitrogen chromium and chromium-nickel steels offer no difficulty in hot working. They can be worked under substantially the conditions employed for steels of normal nitrogen content. These wrought steels have high strength and considerable ductility and toughness; particularly is this true of the high nitrogen 18 per cent chromium and 8 per cent nickel steel. Thus advantages may accrue from the addition of

nitrogen, especially when a non-magnetic wrought product of high yield point is desired, combining machinability with resistance to staining.

Briefly expressed, the beneficial effects of high nitrogen should broaden the applications of the high-chromium and the chromium-nickel steels.

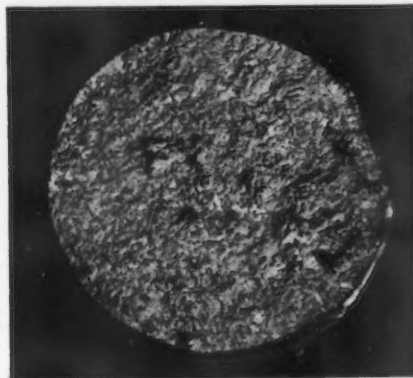
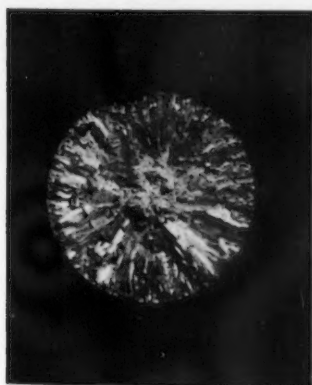
The aid and interest shown by Dr. F. M. Becket, president, Union Carbide and Carbon Research Laboratories, have been invaluable in conducting this investigation. Much credit must be given to F. E. Bacon and James Thompson for the skill they contributed in the making and testing of the steels. W. L. Harbrecht, of Niagara Falls, also contributed greatly in making some of the larger heats of these steels. J. R. Vilella should be complimented for his metallographic work, as should H. L. Hamner for his assistance in analyzing the steels.

<sup>1</sup> The Occurrence and Influence of Nitrogen on Iron and Steel, by N. Tschischewski, Journal of Iron & Steel Institute, 1915, No. II, p. 47.

<sup>2</sup> Relation of Nitrogen to Blue Heat Phenomena in Iron and Dispersion Hardening in the System Iron-Nitrogen, by R. S. Dean, R. O. Day and J. L. Gregg, Transactions of Am. Inst. Min. Engrs., Iron and Steel Division, 1929.

<sup>3</sup> Effect of Nitrogen on Steel, by Frank W. Scott, Industrial and Engineering Chemistry, Vol. 23, No. 9, 1931.

<sup>4</sup> The Effect of Nitrogen on Chromium and Some Chromium-Iron Alloys, by Frank Adcock, Journal of Iron and Steel Institute, No. II, 1926.



carbon with normal nitrogen. The high-nitrogen steels are subject to intergranular attack, and in this respect they offer no improvement over the usual types of this material.

#### Advantages of High-Nitrogen Content Summarized

It has been shown that castings of high-nitrogen steels containing over 20 per cent chromium are relatively strong and tough. These castings consist of small grains, which apparently account for their improved properties. This is pertinent because castings of these steels are sufficiently strong to withstand abuse without cracking, a fact not always true for castings of the plain chromium steels.

Nitrogen imparts high strength to castings of the chromium-nickel steels without appreciably lowering ductil-

SECTION of a centrifugally cast tubing of a steel containing 24.43 per cent chromium, 0.35 per cent carbon, 1.20 per cent nickel and 0.28 per cent nitrogen. At the upper right is a section of a bar of the same steel, while at the upper left is shown the fracture of a steel containing 25.08 per cent chromium, 0.35 per cent carbon, 1.18 per cent nickel and 0.04 per cent nitrogen.



# Ports of Open-Hearth Furnace

**T**HE first feature in the design of a natural gas-fired open-hearth furnace that requires special attention, is the ports.

The ports on an open-hearth furnace serve alternately as an inlet for the fuel and air, and as an outlet for the products of combustion. When used as an inlet, the port controls the mixing of the fuel and air and direction of the flame. Proper port design is very important on a natural gas-fired furnace because the weight of fuel is so small in comparison with the weight of air that the direction of the air stream controls to a large extent the direction of the flame. On the other hand, when heavier fuels are used, the direction of the gas (or oil) stream controls the direction of the flame.

The following table gives this relationship between the weight of fuel and the weight of air. In the columns for coal tar and fuel oil the weight of steam required for atomization of the fuel is included because the atomizing agent helps control the direction of the flame.

When used as an outlet, the port must permit the flow of waste gases from the hearth under the draft conditions existing in the furnace. It must also withstand the high temperature and slagging action of the waste gases.

In the past, it has been generally

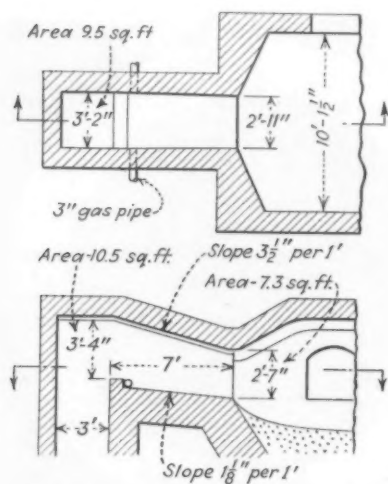


Fig. 1—Port construction of a natural gas fired 25-ton open-hearth furnace.

**D**ETAILS of construction of the open-hearth furnace designed for firing with natural gas are offered by the author in a series of six articles, of which this is the second. The first, enumerating advantages of natural gas firing, appeared Aug. 31. The third article will devote itself to regenerators.

accepted that the limiting factor that controls the area of the ports is the minimum cross sectional area that will remove the waste gases from the hearth. However, on natural gas-fired furnaces the most important function of the port is to control the direction and position of the flame. This can best be accomplished with a comparatively small port area. This small port area should be sufficient to relieve the furnace of the waste gases because the volume of the products of combustion will be smaller on a natural gas-fired furnace than on a furnace fired by other fuels.

## Type of Port:

The port design that is generally recommended for natural gas firing is shown on Figs. 1, 2 and 3. This is the simplest design of port that could be constructed on an open-hearth furnace. It consists of a single uptake for the preheated air and a single port for the gas-air mixture. Experience has shown it to be generally successful for natural gas firing. A plain port of this type also reduces the construction and rebuilding costs of the furnace, and the lines of the port will be maintained longer than the lines of ports on furnaces using other fuels.

Fig. 1 illustrates the port design on a 25-ton basic furnace that gave very satisfactory results. It was a fast-working furnace, producing four 28-ton heats per day, using 1130 B.t.u. natural gas. The fuel consumption from tap to tap was under 4,000,000 B.t.u. per ton.

Fig. 2 illustrates the port design on a 35-ton acid furnace that also gave very satisfactory results. The heats produced in this furnace averaged 40 to 50 tons each, with a few heats going as large as 60 tons. When this furnace was operated at capacity the fuel consumption was as low as

3,000,000 B.t.u. per ton, using 980 B.t.u. natural gas.

## Area of Port:

The proper area for the nose of the port can be determined from the amount and velocity of the gas-air mixture that one desires to pass through the port. The amount of this mixture can be easily determined. It is simply the sum of the gas and air flows corrected for temperature.

For example: Consider the 25-ton furnace, Fig. 1.

The maximum rate of gas consumption = 18,000 cu. ft./hr., or 5 cu. ft./sec.  
10.7 cu. ft. air are required per cu. ft. gas.  
 $\therefore 10.7 \times 5 + 5 = 58.7$  cu. ft. mixture/sec. at 60 deg. F.

Since combustion has actually started when the gas-air mixture passes through the nose of the port, the average temperature of this mixture is probably about 2900 deg. F. However, the temperature of the flame in the furnace may be as high as 3300 deg. F.

$\therefore$  Correcting for temperature.

$2900 + 460$   
 $60 + 460$   
 $\times 58.7 = 380$  cu. ft. mixture/sec. at 2900 deg. F.

Referring to Fig. 1 we note that the area of the nose of the port is 7.3 sq. ft.

$\therefore 380 \div 7.3 = 52$  ft./sec. = velocity of mixture.

This furnace operated on stack draft.

Also: Consider the 35-ton furnace, Fig. 2.

The maximum rate of gas consumption = 25,000 cu. ft./hr.

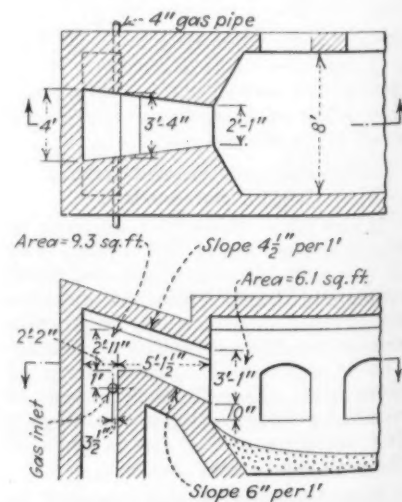
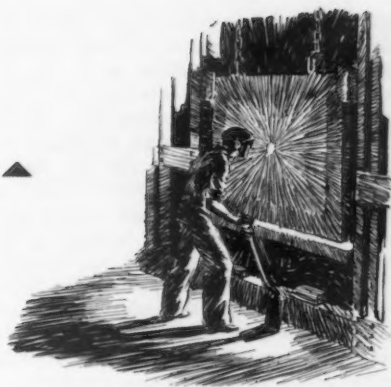


Fig. 2—Port construction of a natural gas fired 35-ton open-hearth furnace.

# ce Fired with Natural Gas ▲ ▲ ▲

By H. J. WILLIAMS  
Industrial Gas Engineer, Equitable Gas Co.  
Pittsburgh



10.7 cu. ft. air are required per cu. ft. gas.  
Calculating as above, we find that the total amount of gas-air mixture at the nose of the port is 494 cu. ft. per sec. at 2900 deg. F.

The area is 6.1 sq. ft.

$\therefore 494 \div 6.1 = 80.8$  ft./sec. velocity of mixture.

This furnace was equipped with a pusher fan for forcing air into the regenerative chamber, which enabled them to secure this high velocity at the port.

The velocity at the port is largely dependent on the pressure and draft available; for most natural gas-fired furnaces operating on stack draft, a velocity of 45 to 55 cu. ft./sec. will give satisfactory results. If the furnace is equipped with a pusher fan, a velocity of 65 to 75 cu. ft./sec. will be satisfactory.

The area of the nose of the port is taken as the unit area from which the other parts of the port are proportioned, as follows (see Fig. 3):

Area at nose of port = A  
Area at back of port = 2A  
Area of uptake at port = 1.3A

For example, suppose we want to determine the port area of a 50-ton furnace, maximum gas consumption 30,000 cu. ft./hr.; velocity of gas-air mixture at port = 50 ft./sec. The port design is to be the same as Fig. 3.

$30,000 \div 3600 = 8.3$  cu. ft./sec.

$\therefore 10.7 \times 8.3 + 8.3 = 97$  cu. ft. mixture/sec. at 60 deg.

$2900 + 460$

$\frac{97}{60 + 460} = 626$  cu. ft. mixture/sec. at 2900 deg. F.

$\therefore 626 \div 50 = 12.5$  sq. ft. port area A at nose of port.

$2A = 2 \times 12.5 = 25$  sq. ft. area of back of port.

$1.3A = 1.3 \times 12.5 = 16.3$  sq. ft. area of uptake.

After determining the area of the rectangular nose of the port, it is necessary to determine the ratio of width to height. If the nose of the port is too wide it will be difficult to

control the position and direction of the flame, while if the port is too high and narrow, the bottom of the flame will be smoky and combustion will not be completed on the hearth. This is dependent upon the size of the furnace and particularly upon the width of the hearth. Large furnaces and furnaces with short, wide hearths require wider ports. As a general rule, the height of the nose of the

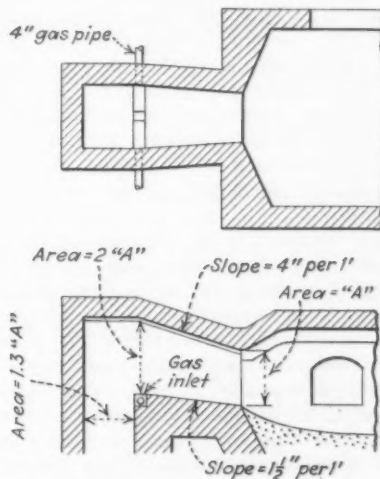


Fig. 3—Port design for natural gas firing recommended by the author.

port should be a little greater than the width.

## Slope of Port:

The slope of the port must be sufficient to drop the flame low enough to sinter the bottom of the furnace. The path of the flame is also partially controlled by the port velocity. Referring to page 259 of "Design of Open-Hearth Furnaces" by A. D. Williams, we find that in order to drop the flame 48 in. in 23 ft., which is one-

half the length of the furnace, the slope of the port for different velocities is as follows:

$V = 49.2$  ft./sec.;  $\phi = 18^\circ 12'$ ; slope = 4 in./ft.

$V = 65.6$  ft./sec.;  $\phi = 13^\circ 33'$ ; slope = 3 in./ft.

$V = 82.0$  ft./sec.;  $\phi = 10^\circ 46'$ ; slope =  $2\frac{1}{4}$  in./ft.

Short furnaces with deep hearths will require a little greater slope.

Referring to the 25-ton furnace, Fig. 1.

Slope of roof of port =  $3\frac{1}{2}$  in./ft.

Slope of floor of port =  $1\frac{1}{2}$  in./ft.

Referring to the 35-ton furnace, Fig. 2.

Slope of roof of port =  $4\frac{1}{2}$  in./ft.

Slope of floor of port = 6 in./ft.

The 35-ton furnace has a much shorter, and deeper hearth than the 25-ton furnace, and this fact justifies the difference in slopes.

The port design recommended by the author is shown on Fig. 3. The slope of the port roof is 4 in. per ft. and the slope of the port floor is  $1\frac{1}{2}$  in. per ft. These slopes will probably be found satisfactory for most furnaces; however, in case the port velocity is very low, or the hearth short and deep, a slightly greater slope should be used.

## Method of Entraining Gas:

The same general method of entraining gas into the air stream is used in all three furnaces, Figs. 1, 2 and 3. However, there are some slight differences in the locations of the gas pipe.

On the 25-ton furnace, Fig. 1, the gas is entrained in front of a heel wall. The gas pressure at the burner is very low, being only a few inches of water. The pressure in the line on this furnace was 8 oz. This figure depends upon the pipe size, etc., but the usual range is 8 to 20 oz. This is a very common method of introducing gas into the air stream; however, it has the disadvantage that dirt and cinders carried up on the port by the outgoing products of combustion tend to clog up the gas burner tunnels.

On the 35-ton furnace, Fig. 2, the gas is introduced into the air stream down in the uptake. The gas burners are set 12 in. below the floor of the port and  $3\frac{1}{2}$  in. from the inside wall of the uptake. The edge of the

## AIR REQUIREMENTS FOR DIFFERENT FUELS—5 PER CENT EXCESS AIR

	Natural Gas	Coke Oven Gas	Pro-ducer Gas	Mixed Blast Fur-nace Gas and Coke Oven Gas	Coal Tar*	Fuel Oil*
Air per lb. fuel, lb.	17.0	15.5	1.5	2.9	5.0	5.6
Ratio: Weight fuel ÷ Weight air	0.059	0.065	0.667	0.345	0.20	0.179

\*Includes steam for atomization on basis of  $1\frac{1}{4}$  lb. steam per pound oil.

burner tunnel is just  $1\frac{1}{2}$  in. from the wall. The purpose of setting the gas burners in this position is to secure a more intimate gas-air mixture, and especially to get a small amount of air underneath the gas in order to clear up any tendency for the flame to be smoky on the bottom when a high, narrow port is used. This setting of the gas burners is very critical, and if they are set too low or too far out in the uptake, the port roof will be badly burned. The proper location for the burners must be found by moving them around a little until the desired flame is secured.

On our recommended port design, Fig. 3, the gas flows into the air stream at the intersection of the port and uptake. A shelf  $9 \times 9$  in. in cross section, as shown in the sketch, is constructed in order to introduce the gas on the under side of the air stream, to provide slow mixing of gas and air, to give luminosity to the flame, and to prevent burning the knuckle of the roof. This arrangement is an improvement over that shown on Fig. 1, because the cinders cannot collect in front of the burner tunnels. Several bricks are placed in the center of this shelf to deflect the gas upward into the center of the air stream.

#### Four-Uptake Design:

Fig. 4 shows the port construction on a 75-ton basic furnace that has given very satisfactory results in operation. The furnace is equipped with two regenerators and four uptakes at each side. This port design can be used to vary the characteristics of the flame. The two inside uptakes, A, are connected to the inside regenerative chamber, while the two outside uptakes, B, are connected to the outside regenerator. When a large volume of the total air required is passed through the inside uptakes, A, the air and gas are premixed, thus resulting in a sharp cutting flame. When most of the air is passed

through the outside uptakes, B, combustion is slower and a highly luminous flame is produced.

In the furnace, Fig. 4, the ratio of air passing through the inside and outside uptakes is determined by the setting of air hoods which are located on the flues between the regenerative chamber and the reversing valve. The furnace is operated on stack draft. If the furnace were equipped with a forced draft blower, dampers in the flues would have to replace the air hoods. The arch over the inside uptakes should be water-cooled because the hot furnace gases pass on both sides of the brick work. This can be done by placing several  $1\frac{1}{2}$ -in. water pipes across the furnace inside the brick work.

#### Gas Burners Through End Wall:

On all the furnaces just described, very low pressure gas has been introduced into the sides of the air stream. However, there are many oil and producer gas-fired furnaces with ports practically the full width of the furnace, on which it would not be practical to entrain gas through the sides without rebuilding the ports of the furnace. On jobs of this kind gas can be injected into the furnace through a burner placed in the end wall as shown on Fig. 5. This is a three-uptake furnace of the type that is commonly used for oil, tar, or producer gas.

In converting a furnace of this type, that formerly used producer gas, to natural gas, it is first necessary to arrange the old gas regenerator so that it will preheat air, then the center uptake which was formerly a gas uptake, is now an air uptake. The producer gas port is then removed and a trough constructed from the center uptake to the hearth. The outlets of the side uptakes are built up until they are about 18 in. higher than the outlets of the center uptake. A water-cooled gas burner of the type shown on Fig. 6 is then

placed through the end wall and fires down the trough.

The water-cooled gas burner shown on Fig. 6 consists of a 4-in. water jacket protecting a  $2\frac{1}{2}$ -in. gas pipe. This burner gave very satisfactory results on a 30-ton basic furnace. Circulation of water to the tip of the burner is secured by means of baffle strips. These strips are welded to the  $2\frac{1}{2}$ -in. pipe and the assembly is then placed inside the 4-in. water jacket. The baffle strips were used instead of placing a water pipe in the burner because they reduced the size of water jacket required. In designing water cooled burners it is a good idea to make the water jacket as small as possible in order to keep the heat loss at a minimum. The

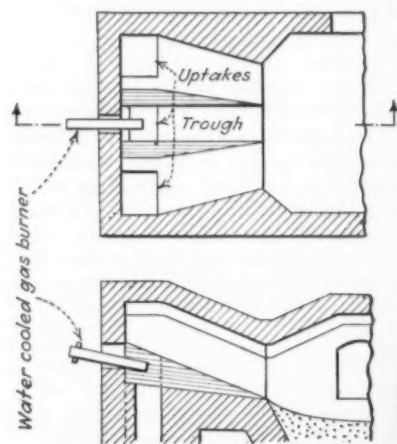


Fig. 5—Where ports are practically as wide as the furnace, a burner may be placed in the end wall.

heat content of the gas used was 1130 B.t.u. per cu. ft. and the gas pressure in the line to the furnace was 2 lb.

Water-cooled gas burners of this type should extend about half-way across the center uptake. If the nose of the burner is too far forward combustion will not be complete on the hearth and part of the gas will be burning in the downtakes, slag pocket, and regenerator on the outgoing side. If this condition exists it will be difficult to get the steel hot and the campaign of the furnace will be shortened by burning out the checkerbrick. If the nose of the burner is too far back there will be too much premixing of gas and air and a hot spot will be developed on the incoming side. The center of the port through which the gas passes is troughed so that the secondary air that comes up the two outside uptakes will tend to cover the gas stream. This type of burner gives a sharp, hot flame, melts down quickly and turns out heats fast. This method of firing natural gas has been tried in several plants, and the fuel consumption usually runs slightly

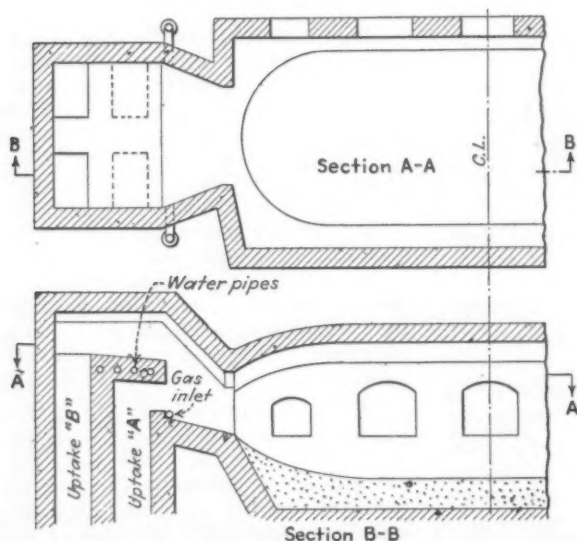


FIG. 4—Port design of a successfully operating 75-ton open-hearth furnace fired with natural gas.

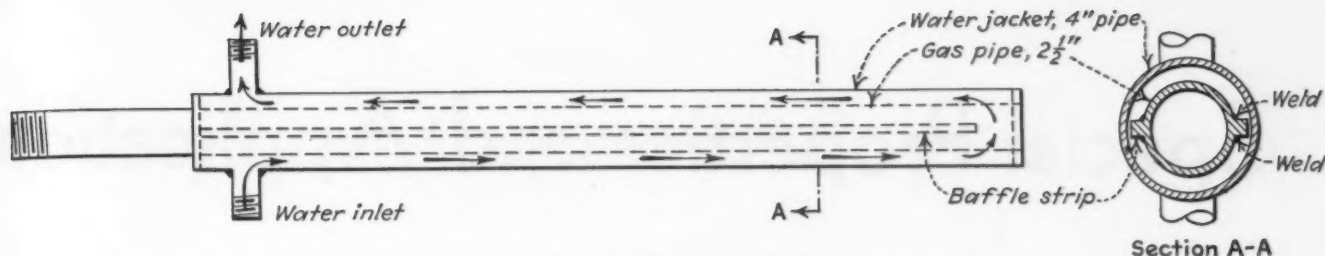


Fig. 6—The burner for the end-wall firing application is water cooled.

higher than furnaces entraining gas through the sides of the ports.

End-fired furnaces do not require as much stack draft for their operation as furnaces entraining gas through the sides of the ports. Consequently, difficulties such as the burning of gas in the downtakes, etc., may often be overcome by lowering the stack damper.

It should be borne in mind that the recommended method of burning natural gas in the open-hearth furnace is that shown in Fig. 3; namely, introducing gas into the air stream by means of pipes at the sides of the ports. However, this method of firing by installing a burner in the end wall has the advantage that it can be used on a furnace with a straight roof or

wide ports without making extensive changes to the brickwork.

The construction of a suitable port is the first step toward the successful operation of a natural gas-fired open-hearth furnace. The other features that require special attention, are regenerators, combustion control, and insulation. They will be discussed in subsequent articles.

## Growth in the Use of Alloy Steels

CONSUMPTION of alloy steels is pictured in the accompanying chart. In the form of rolled and forged products—that is, alloy steel originating in ingots—there has been a fairly steady increase since alloying has been a factor. The expansion in fact has been such that four and a half times as much such steel has been latterly going into use as was the case 15 to 20 years earlier. In the form of castings, as distinguished from ingot alloy steels, a more rapid increase is indicated over the more recent years, but an actual steep decline occurred from an early peak just before the war to a low point around the end

of the second decade of the century. This recession at the end was nearly 40 per cent off from that peak and nearly 20 per cent under the 1911 rate.

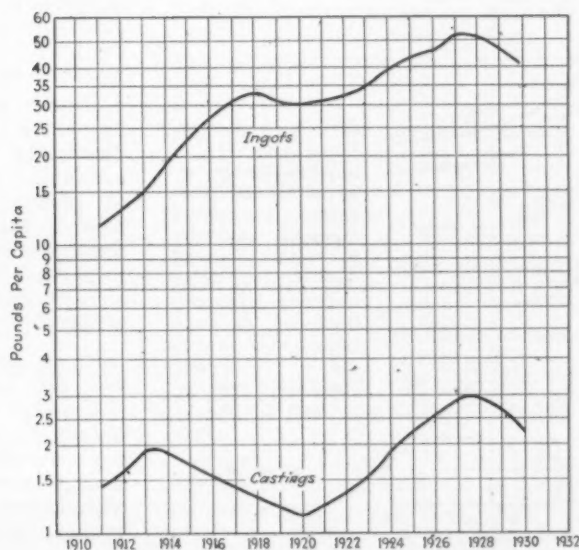
### Five-Year Averages Used

The curves are based upon the statistics of production of the American Iron and Steel Institute, going back to 1909. Five-year averages of the per capita production, centered for each five-year group, were used to get a smooth curve to show the consumption. It will be noted that the curve for the castings is steeper from 1920 on than the corresponding part

of the curve for the ingots. This means that demand has been growing faster for castings than for alloy steels in other forms. In the seven years ended with 1927, alloy steel castings appear to have reached a rate of use two and a half times that of 1920, while with alloy steel ingots, consumption in 1927 was one and three-quarter times that of 1920.

### Expansion in Demand for Rolled and Forged Alloy Steels Steady

The accompanying table of the per capita five-year averages of production shows that whereas in 1911 the volume of ingots was substantially eight times that of the castings, in the last years of the war the ratio became 25 to 1 and now it is of the order of 18 to 1; the expansion in demand for the rolled and forged alloy steels practically never stopped, as shown by the curves, while a seven-year slump (1913-1920) characterized the use of the castings.



Consumption of alloy steels in the form of rolled and forged products—that is, alloy steel originating in ingots—has shown a steady increase. In the form of castings, there has been a more rapid increase in recent years

CONSUMPTION OF ALLOY STEELS  
Pounds per Capita of Population

	Ingots	Castings
1911.....	11.7	1.44
1912.....	13.5	1.65
1913.....	15.1	1.94
1914.....	19.0	1.91
1915.....	22.7	1.72
1916.....	27.3	1.60
1917.....	30.7	1.47
1918.....	33.2	1.32
1919.....	30.5	1.24
1920.....	30.4	1.18
1921.....	31.0	1.27
1922.....	32.5	1.42
1923.....	34.9	1.57
1924.....	40.6	1.97
1925.....	43.0	2.25
1926.....	46.3	2.55
1927.....	52.6	2.92
1928.....	51.9	2.93
1929.....	47.7	2.68
1930.....	41.0	2.26

# Special Properties and Application of

By EDWIN F. CONE

**H** EAT treatment and cold working bestow some striking effects on certain beryllium-copper alloys, considerably augmenting their range of usefulness. It is the purpose of this article to outline some of the properties resulting and to describe some of the applications of these alloys. In THE IRON AGE of Aug. 10 appeared the introductory article on the subject.

## High Resistance to Wear

In the cast condition certain beryllium-copper alloys have high resistance to wear. In wear tests of such alloys on an Amsler machine a 0.43 per cent carbon steel, oil quenched from 1600 deg. F. and tempered at 1100 deg. F., was used as the standard for comparison. This produced a hardness of C22 Rockwell. Six disks of a 2.35 to 2.46 per cent Be alloy were used. The aim was to ascertain the effects of age or precipitation hardening on the wear resistance.

As cast, the disks had a hardness of B73.1 to B85 Rockwell. A solid solution treatment at 1479 deg. F. for ½ hr., followed by the precipitation hardening treatment at 600 deg. F. for 3 hr., resulted in hardnesses of Rockwell C41.3 and C43.3. The effect of the prolonged heating at 575 deg. F. for 24 hr. resulted in a softer product, or Rockwell C31.4 and C30.1.

The Amsler tests showed that the disks with a Rockwell hardness of B85 (as cast) lost 0.0084 g. per

10,000 revolutions as compared to a loss of 0.0168 g. for the steel specimen. The precipitation hardened (or C43.3) specimen lost only 0.0003 g. while the steel lost 0.0001 g. The 24-hr. precipitation hardened specimen (C31.4 to C30.1) suffered a much heavier loss.

## Hardness of the Alloys Demonstrated

Hardness tests on cast 1-in. rods of two beryllium-copper alloys—1.85 per cent and 2.35 per cent Be—have been made by a laboratory in Brooklyn, N. Y. Heating the specimens in molten salts at 525 deg. and 575 deg. F. at ½-hr. periods from 1 to 3 hr. showed that at 525 deg. the maximum hardness for both compositions was reached at about the 2½- to 3-hr. heating period.

Some of the effects of heat-treatment and cold-rolling on 2 per cent beryllium-copper sheets are described by the American Brass Co. In the soft annealed or solid solution condition, the Rockwell hardness (1/16 in. 100 g.) is B57\* and the tensile strength 54,400 lb. per sq. in. After precipitation hardening the hardness is B106 and the tensile strength 145,300 lb. per sq. in. After rolling (before heat treating) to 6 B & S Nos. hard, the hardness is B99, with a tensile strength of 107,800 lb. per sq. in. If this is then precipitation hard-

ened, the Rockwell value is B112, with 176,630 lb. per sq. in. as the tensile strength.

## Good Electrical and Thermal Conductivity

The electrical conductivity of these alloys is reported as high, especially as compared with steel, phosphor bronze and other high-strength materials, according to the results of investigations by two American companies. It is again the heat treatment which brings this about. If the precipitation hardening period is extended to 48 hr., the highest conductivity is reached at around 2 per cent beryllium. This fact and other relations are shown by the chart, Fig. 1.

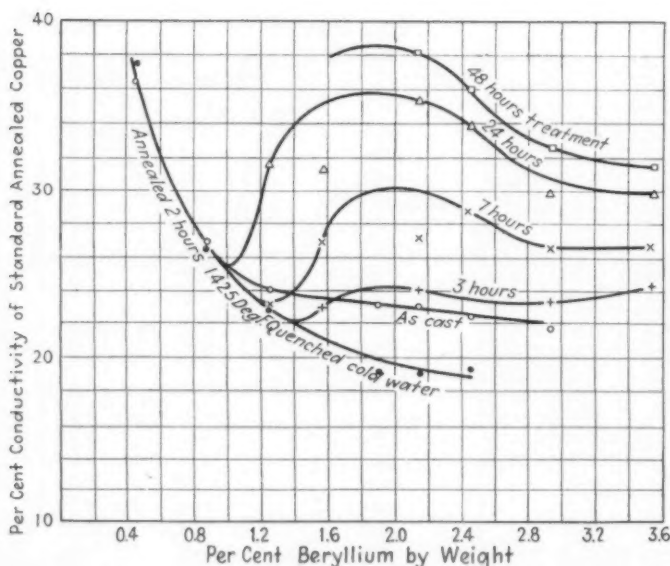
Some preliminary or incomplete data regarding the thermal conductivity of these alloys have been ascertained by a reliable laboratory. An alloy of copper and beryllium containing 2.45 per cent Be was used and tests were made in the "as cast," in the quenched and hardened, and in the quenched and annealed conditions. For quenching the specimens were heated to 1450 deg. F., held for 1 hr. and quenched in cold water. Hardening was accomplished by heating at 575 deg. F., followed by air cooling.

The effect of temperature on the thermal conductivity of the 2.50 per cent alloy is quite unusual and interesting, says the report, as a means for studying structural changes in age-hardening alloys. There is a sharp increase in conductivity, related in some way, probably, to precipitation taking place within the alloy. Insufficient data are available to fully interpret the results, and more research is necessary.

Considerable resistance to corrosion by the beryllium-copper alloys is indicated by meager information now available. In discussing applications of products, this property will be further elaborated. The American Brass Co. is authority for the statement that these alloys are as corrosion resistant as any of the wrought copper-tin alloys.

## Marked Resistance to Fatigue

Unusual resistance to fatigue is shown by the beryllium-copper alloys, according to researches made in Europe as well as in this country. This varies, of course, with the type of heat treatment and with the de-



**FIG. 1 — Electrical conductivity of beryllium-copper alloys in "as cast" condition, showing change in conductivity with increased time of precipitation hardening treatment. Hardening furnace temperature of 575 deg. F.  $\pm$  15 deg. (Beryllium Development Corp.)**

# on of Beryllium-Copper Alloys ▲ ▲ ▲

gree of cold working. Some of the highest properties in this field have been brought out in the wrought or rolled products, particularly in springs.

It is thus evident that the introduction of small amounts of beryllium into copper results in unusually high fatigue limits, greatly improved values in electrical conductivity, a high corrosion resistance, equal to that of copper-tin alloys, and remarkable ductility.

The fact that these alloys are heat treatable greatly enhances their value. For example, intricate parts can be made in the soft or semi-hard (solid solution) condition and then heat treated after fabrication. This may increase the tensile strength, fatigue life, abrasion and corrosion resistance, hardness and other properties. The Riverside Metal Co. cites the following: A test was made on a piece of hard-drawn beryllium-copper wire containing about 2.50 per cent Be. The original tensile strength of 108,000 lb. per sq. in. was increased by heat treatment to 190,000 lb. per sq. inch.

## Hardness Increased by Rolling

The extent to which rolling increases the hardness of a 2 per cent beryllium-copper alloy is reported to be as follows by the American Brass Co.:

	Brinell Hardness	Tensile Strength, Lb. per Sq. In.
Annealed soft.....	80	54,400
2 B and S Nos. hard (20 per cent reduction).....	130	85,000
6 B and S Nos. hard (50 per cent reduction).....	212	108,600

Machinability is one of the outstanding properties of these alloys. It compares favorably with that of other high-strength metals. Though they cannot be classified as free cutting alloys, they are not difficult to machine.

From the foregoing brief recital of certain facts, it is evident that there are many possible practical applications of these alloys.

## Some Major Commercial Applications

One of the main practical applications thus far of the wrought and rolled beryllium-copper alloys is springs, particularly for electrical purposes and instruments. In the heat-treated condition these alloys have a tensile strength of 175,000 to 180,000 lb. per sq. in. with an elastic

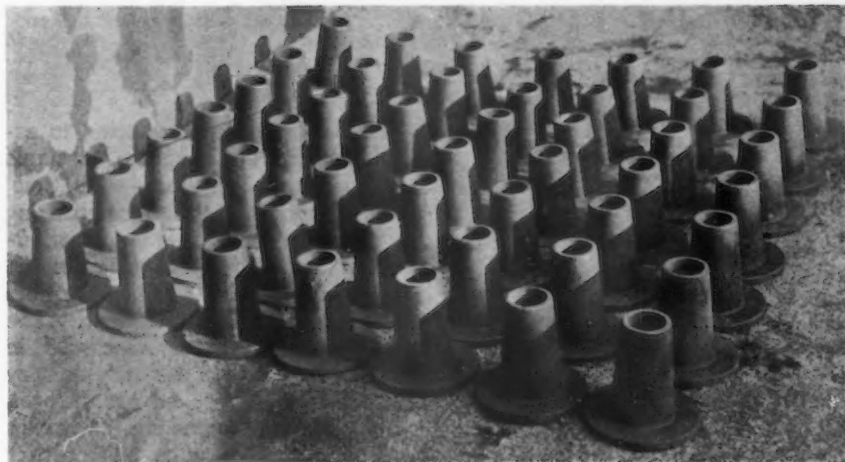


FIG. 2.—Beryllium-copper bearing sleeve castings for adjustable pitch propellers for airplanes.

limit (Johnson) of 130,000 lb. The electrical conductivity is high compared with other metals for springs. The modulus of elasticity (Young's) is 18,000,000 with a torsion modulus of 8,000,000. The alloys possess a resistance to the softening effects of operating temperatures up to 450 deg. F. These properties, including an absence of set and a very high resistance to fatigue, are largely obtained by heat treatment.

That these claims for properties are justified is being borne out in actual field experience. An outstanding use is as contact clips for cord sets and in the pins and plugs on appliances. The use of beryllium-copper has cut down the burning or arcing and the consequent wear, decidedly extending the life of the cord sets. In commercial laundries the life of cord sets with beryllium-copper sets have been 2½ times the average life of sets with standard spring elements.

Corresponding satisfactory performance has resulted in wall switches, relay parts, circuit breaker parts, brush holder springs and in electrical and recording instrument springs. Trials of standard spring bronzes showed on accelerated tests a life of 500,000 to 1,200,000 operations maximum. Beryllium-copper of exactly the same size and gage ran to 11,000,000 operations with no failures.

A spring 0.010 x ¼ x 2% in. carrying a 10-amp. current, which is a high current density, maintained its spring effect to 2,000,000 operations when

the tungsten contacts began to fail. Without current, the spring has now been run up to 5,000,000 without indication of fatigue. Duplicate bronze springs failed before the 2,000,000 mark, due to the softening of the spring temper because of the heat involved.

## For Firing Pins in Fire Arms

Recent tests of beryllium-copper alloys as firing pins in fire arms have revealed remarkably increased life over older materials. Every time the trigger is released with the piece unloaded means that the shoulder of the firing pin comes up with heavy impact against the retaining ring. The result is a shock to the unsupported shank end, which sooner or later results in its snapping, with consequent time and trouble for replacement. Accelerated tests of beryllium-copper as pins have shown that the new alloy ran 7 hr. before failing. The best performance with high-grade steel alloys had been 33 min. of life.

## For Tools Which Will Not Emit Sparks

Elimination of sparking in the use of tools in working places where there is a fire and explosion hazard has been a desideratum for a long time. Such tools include wrenches, chisels, hammers, scrapers, screw drivers and ordinary hand tools. Such tools made of the beryllium-copper alloys do not spark at all and meet the new re-

(Concluded on page 66)

# Phosphorus in Chromium Alloy Cast Irons

A SERIES of chromium alloy cast irons containing varying amounts of phosphorus were investigated in the as-cast, stabilized, annealed and hardened and tempered conditions by J. E. Hurst, technical director of the Sheepbridge Stokes Centrifugal Castings Co., Ltd., Chesterfield, Sheffield, England, and the results were contributed to the (British) Iron and Steel Institute in a paper presented at a recent meeting of the institute at London.

The specimens used were prepared from centrifugally cast drums. The test pieces which were machined were 4.4 in. in outside diameter, 3.85 in. in inside diameter by 8 in. long, and equipped with a chucking flange at one end. The ring-form test pieces were machined from the central portion.

The castings were prepared from a chromium alloy mixture made up by melting Barrow hematite, Sheepbridge phosphoric foundry pig iron, and ferrochromium. The hematite and ferrochromium were melted in one crucible and the phosphoric iron in another. Varying quantities of the two melts, mixed together and cast, provided a series of castings of varying phosphorus contents. The castings were made under the regular and uniform conditions of casting temperature and die temperature normally adopted in the centrifugal casting process. Seven different castings were prepared; the full analysis of each are given in the accompanying table.

## Scope of the Tests

Twelve ring specimens were prepared from each casting and Brinell

IN addition to attempting to establish the effects of a single variable in cast iron—this time, phosphorous,—the accompanying paper serves as another contribution to foundry technology in the field of alloy irons and in the field of their heat treatment. The author, Mr. Hurst, discussed in these columns as recently as May 18, it may be recalled, the nitrogen hardening of aluminum-chromium iron castings. He is one of that increasing number who are lifting the casting of iron into the realm of science and engineering.

readings were taken from the complete set of all rings. One group of rings was retained for the determination of the properties in the as-cast condition. Other groups were arranged to enable the properties to be measured after hardening; after hardening and tempering at various temperatures; after stabilizing; stabilizing, hardening and tempering; annealing; annealing, hardening and tempering.

In every case hardening was carried out by raising the specimens to a temperature of  $875 \pm 5$  deg. C. in an electrical resistance furnace, followed by quenching in oil. Subsequent tempering was performed by maintaining the specimens at the desired temperature in a bath of molten salts for a period of 10 to 15 min.

The stabilizing treatment used consisted of maintaining the rings at a temperature of  $550 \pm 5$  deg. C. for a period of 20 min. followed by slow

cooling in still air. For the annealing treatment the specimens were packed in the cast iron borings and held at a temperature of 900 deg. C. for a period of 50 min. followed by slow cooling in the furnace.

## Hardness as Cast and When Hardened

The hardness in the as-cast condition shows a steady increase with increasing phosphorus content. This is as would be expected, and is clearly shown in the lower curve of Fig. 1.

In the quenched condition the hardness values are raised to within the range of 500 to 580. In this condition the effect of increasing phosphorus appears to cause higher hardness values, with the exception of the curious behavior of the two samples with intermediate phosphorus contents of 0.63 and 1.06 per cent, which do not attain the high level of hardness and consequently produce the curious inflexion in the hardness curve, Fig. 1.

In the tempered conditions the hardness is lowered with increasing tempering temperature, and with a tempering temperature of 600 deg. C. values of 350 to 375 are obtained.

The peculiar behavior of the two specimens with intermediate phosphorus contents persists, but not consistently, on tempering up to 450 deg. C. In all cases the high-phosphorus specimens maintain uniformly a higher level of hardness than the low-phosphorus ones, in spite of the initial higher combined carbon contents of the latter. At a tempering temperature of 600 deg. C. all the irregularities are smoothed out and a practically uniform hardness for all phosphorus contents is attained.

## Tensile Strength Variations

In the as-cast condition the EN value, or modulus of elasticity, shows a marked and steady increase with increasing phosphorus contents. In the hardened and hardened and tempered conditions, an increase in the phosphorus is accompanied by an increase in the EN value, although the effect of these treatments in each case is to lower the general level of this value. Tempering at the higher temperature of 600 deg. C. is accompanied by a re-

ANALYSES OF SPECIMENS

Spec. No.	T.C., Per Cent	C.C., Per Cent	Graphite, Per Cent	Silicon, Per Cent	Manganese, Per Cent	Phosphorus, Per Cent	Chromium, Per Cent
1	3.39	0.52	2.87	2.21	1.07	1.56	0.52
2	3.49	0.49	3.00	2.16	1.08	1.30	0.71
3	3.44	0.30	3.14	2.44	1.01	1.06	0.59
4	3.55	0.46	3.09	2.35	1.00	0.63	0.61
5	3.58	0.39	3.19	2.44	0.93	0.58	0.62
6	3.60	0.54	3.06	2.44	1.09	0.43	0.55
7	3.81	0.59	3.22	2.49	1.02	0.035	0.61

covery of the EN value in all specimens in the direction of the values of the as-cast condition. The fall in the EN value due to hardening is greatest in the lowest phosphorus specimens, and an increase in the phosphorus appears to minimize the reduction of this value due to this cause (see Fig. 2).

The effect of increasing phosphorus in the as-cast condition is to cause a rapid and steady decline in the tensile strength. These results are shown in Fig. 3. The hardening operation is

recorded a negative gap movement of substantial magnitude in the lowest-phosphorus specimen.

The gap movements in all the tempered specimens varied most irregularly, but in all cases up to and including the tempering temperature of 450 deg. C. the gap movements were negative in sign. With a tempering temperature of 600 deg. C. the gap movements reverted to the positive sign as in the as-cast condition, but were consistently lower in value. This observation would lead one to

ally been to lower the tensile strength, Brinell hardness and EN value. Broadly, the magnitude of the reduction is greater in the low-phosphorus specimens.

Annealing at 900 deg. C. has had the effect of reducing the Brinell hardness. The magnitude of the reduction increases with the phosphorus content, the high-phosphorus specimens showing a sharp fall. The annealing treatment has been accompanied generally by an increase in the tensile strength.

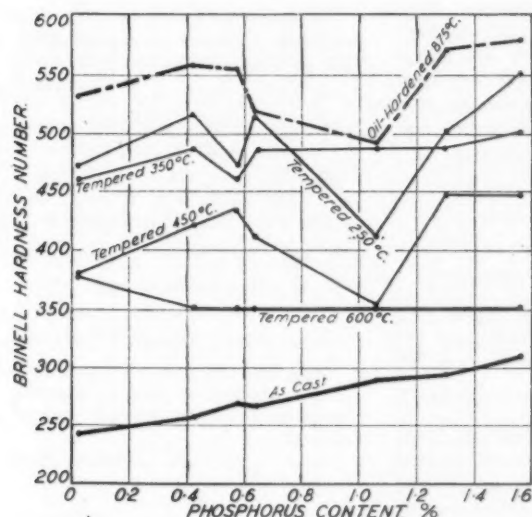


Fig. 1—Brinell hardness numbers (above).

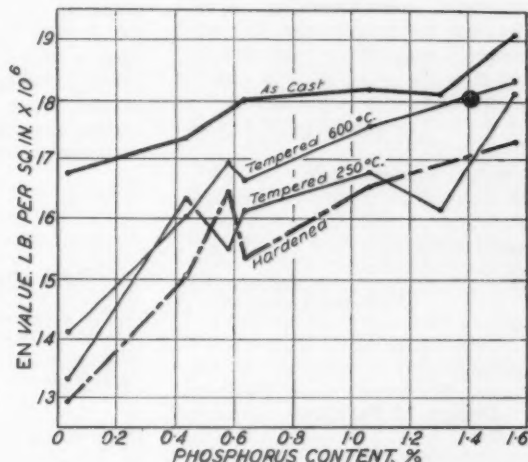


Fig. 2—EN values, as cast, hardened, and tempered (upper right).

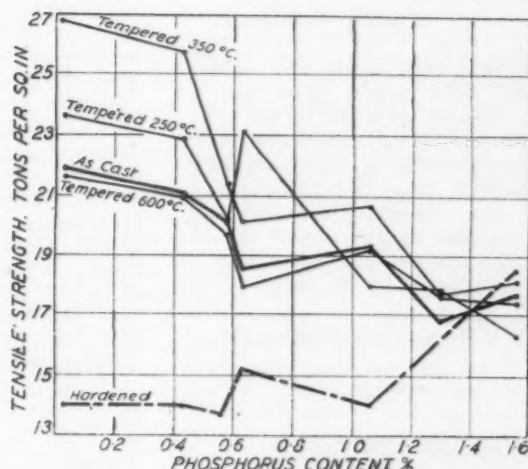


Fig. 3—Tensile strength, as cast, hardened, and tempered (at right).

accompanied by a substantial drop in the strength values, and subsequent tempering operations result in a marked recovery to strength values still higher than those of the original material as cast. No drop in strength is experienced in the hardened specimen containing 1.5 per cent of phosphorus. Actually, the strength of this specimen in the hardened condition is slightly higher than that of the as-cast specimen.

#### Study of Internal Stresses

When cutting gaps in test rings of this form it was noticed that the cut ring may show a tendency to open or to close. By cutting the gap in the ring while it is held in a clamp, the gap, as cut, can be measured. This movement of the rings on slitting is due to internal stresses, and the magnitude of this movement may be used as a comparative guide to the change in the internal stress conditions.

All the specimens in the as-cast condition showed positive gap movements, indicating the initial presence of internal stresses. The amounts of gap movement in these specimens varied somewhat irregularly, and no relation between them and the amount of phosphorus present is apparent.

All the specimens in the hardened condition showed a complete reversal of the internal stress conditions and

suspect the existence of a critical tempering temperature at which the internal stress condition as revealed by the gap movement is zero. By re-plotting the gap movements in relation to the tempering temperature, it would appear that the critical temperature for these specimens lies within the range of 500 to 570 deg. C. This observation is one of obvious importance in the practical heat treatment of cast iron by hardening and tempering.

#### Results With Annealing

A summary of the remainder of the paper is as follows:

The effect of stabilizing has gener-

The annealing treatment has not eliminated internal stresses, and positive gap movements are recorded in every specimen. In the low-phosphorus specimens the gap movement has been definitely increased.

The hardening effect in the specimens subjected to the prior annealing treatment is accompanied by irregular results in individual specimens. The degree of irregularity is greater in the specimens with over 1 per cent of phosphorus, and becomes less in the lower-phosphorus specimens, in which the hardening effect is practically equal to that for the as-cast condition.

# Putting the Question Mark to Work

## Alloy Tubing Sought

*Can you tell us what material to use for a 3/4-in. tubing with 16-ga. walls that will have strength and at the same time be an efficient conductor of heat? It must be easily welded and machined and must resist corrosion.*

Moore Dry Kiln Co.

IT is difficult to meet all of these conditions. Our metallurgical department suggests experimenting with alloys having approximately 25 per cent chromium and 10 per cent nickel, feeling that some alloy of this character might serve the purpose.

Ludlum Steel Co.

OUR technical department advises that pure copper would be best for this service on account of its high heat conductivity and good resistance to tannic acid.

National Tube Co.

## Design of Punches

*When punching a hole 2 in. x 2 1/2 in. in 3/4-in. metal, what should be the shape of the face of the punch to secure the best results?*

Cheney Weeder Co.

OUR procedure under the conditions given would be to put a 3/64-in. land at each end of the 2 1/2-in. dimension of the punch and then to swing a radius of approximately 28 in. between these two. This would tend to give a shearing action in the center of the section which would give a sharper cut and better punch action than would be the case with a straight profile.

Moore Drop Forging Co.

## Cleaning Bolt Threads

*We are anxious to know the processes or equipment required for removing excess material from threads on bolts, nuts, etc., after a hot dipped galvanizing.*

Pacific Car and Foundry Co.

SOME manufacturers are successfully using a rotating steel cylinder fitted with baffles and designed by W. H. Spowers, Jr., New York. Some others are using small centrifugal machines for screws and taps.

J. S. H.

WE use a Watrous galvanizing machine which we have had in operation for a great many years. To this we added the Diamond improvements which were developed recently and we now are successfully hot gal-

vanizing bolts and nuts by this combination.

Russell, Burdsall & Ward  
Bolt & Nut Co.

WE have found that if pieces are preheated before entering the spelter, to a temperature equal to or above the galvanizing temperature, a much thinner coating of zinc is formed and, under this condition, excess material is more easily removed. For the preheating we have successfully used a salt bath having a descaling effect. A film from the bath remains on the piece to be displaced by the spelter almost coincident with the depositing of the thin zinc coating.

A. E. B.

## 5 Per Cent Chromium Steel

*We have had difficulty finding a suitable material for the tubing of refrigerator coils. Can you give us some suggestions?*

J. W. H.

DESPITE a vast amount of collected data, the selection of material to withstand a given set of corrosive conditions is often difficult. For this reason some manufacturers carry on laboratory investigations to determine the material best suited for their particular needs. It happens that such an investigation was made by a company in the very field of the present inquirer. As part of the investigation, four pairs of tubes made of four different materials were joined to a header and subjected to an extended test. The tubes were all heated to 600 deg. F. for 1 hr., after which a blast of air at room temperature and high humidity was applied for 2 hr. Following this the tubes were again heated to the 600-deg. temperature and the cycle was continued all day long for several months. At the end of the test, examination showed corrosion and severe pitting in two of the examples, a fair condition in the third, and absolutely no pitting in the fourth. The material in the fourth pair was a 5 per cent chromium steel.

Richard Tull.

## Die-Cast Gray Iron

*Do you know that anyone is using gray iron for the manufacture of crankshafts?*

P. H. B.

IT is now possible to make alloyed irons capable of heat treatment much the same as steel, and by this means tensile strengths may be brought up to about the same limit as

on crankshaft material—i.e. 90,000 lb. per sq. in. The ability to cast a crankshaft true to form, thus eliminating most of the expense of turning and machining, is a definite advantage. Also, a superior chill is obtainable where hard metal is required.

W. E. Lewis.

## Nickel-Plating of Iron

*Where can I secure information on making a small electro-plating outfit for plating iron with nickel?*

F. J. R.

IN our experience the usual practice is to first copper-flash from a cyanide bath, then copper-plate from an acid bath, and finally, to nickel-plate over the buffed copper.

Grasselli Chemical Co.

## Inspection of Castings

*How can machine shops protect themselves against defective material supplied to them by foundries and forge shops?*

M. Sorokin, Moscow.

IN purchasing castings we reserve the right to reject after rough machining. In this way we have practically eliminated initial inspection, which usually does not reveal subsurface defects, and a thorough inspection after rough machining catches 95 per cent of defective material and saves the more costly finish machine work on rejects. The result of this scheme has been closer cooperation with the foundry. The nature of our own machine work and of the final purpose of our various products has been studied, and the castings designed accordingly, with the result that the percentage of castings rejected after rough machining has constantly declined.

A. P. C.

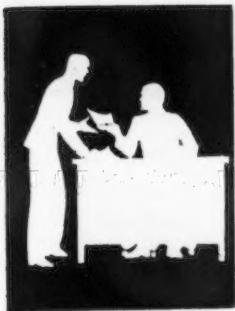
## Preventing Warping

*How can I prevent warping of small alloy castings during heat treatment? These castings are too complicated to hold in any form of jig. Would normalizing before machining help?*

W. W. M.

OUR experience indicates that most warpage results from too drastic quenching, which causes small sections of a casting to shrink more quickly than the large sections. The remedy in many cases is to quench only as much or as quickly as may be necessary to give the desired physical properties. Most quenching is more severe than required. Sometimes good results are obtained by in-

(Continued on Page 68)



# Cost Saving by Revision of Clerical Details Is Possible When Volume Falls

By F. KLEIN\*

**D**URING the past year it has become evident to an increasing number of business men that they must contribute to the underlying factors which make for industrial revival. Perhaps this determination by executives to see facts as they are, and to adjust their actions accordingly, is one of the most cheerful signs on the business horizon.

It must be recognized that present sales measure the size of the business, and that expenses must be in proportion to those sales. Sources of expense reduction are overlooked in many organizations because of failure to recognize the shrinkage in the size of the business.

During a period of increasing sales at high selling prices, and sometimes with forced production methods, many expedients are developed to cope with the various situations which occur. Because of the inability of executives to give individual attention to the many phases of their business, a system is developed and expanded automatically to bring all facts to their attention. Reports are designed to meet the demands of the times. Statistical data are accumulated on certain existing conditions. Large profits, with the possibility of still greater returns, justify this extension of system details, and the cost of the system is frequently negligible compared to the returns made possible through an intelligent use of it.

But with curtailment of business, the elaborate system and sets of reports and statistical data, designed when volumes of sales were several times greater, and when expense was not the paramount issue, are frequently retained intact. Under these conditions it is not unusual to find organizations with as many indirect workers employed on the system details as there are productive workers in the plant. This tendency to retain the old routines under radically changed conditions leads business men to believe that there are certain

non-variable classes of labor expense regardless of productive volumes.

Those departments which appear to be busiest in times of reduced volume are frequently the most fertile fields for curtailment of routine and expense. It is well recognized that the effort required to operate the various accounting, production, statistical, and other divisions, will vary little with changing volumes of business. It is natural, then, that so long as the elaborate systems of former years are retained, the staff necessary to operate them, together with the various forms and records, must also be retained. If this class of expense is to be brought into line with current conditions it is essential that the system itself be modified to conform to present requirements, both as to current needs and expenses therefor.

Probably the most effective way to make a revision of this kind, is to make a complete survey of all so-called paper work now being performed in the business. For this purpose a form might be handed to every employee engaged on record or system details. The time employed should be apportioned over the various duties, and names or numbers of all forms used should be stated. This complete inventory of all duties will doubtlessly bring to light a number of records and reports of little use under present conditions.

Of greater importance in the survey are the major records and reports so often accepted as a fixture of the business. If the rates of the employees engaged on the various details of system are apportioned to each such detail, the total cost of any record or routine as well as the total cost of the organization's system can readily be obtained. The test should then be, whether the cost is commensurate with the present return. Objection is sometimes raised to the discontinuance of certain statistical data on the ground that it will prevent comparisons with past and future

performances. The answer is found in the fact that comparisons of present operations with those of the past mean practically nothing. They may be interesting, but are not helpful. Similarly, present operations when compared with those of the future when entirely different price levels and conditions exist will be valueless.

Perhaps the best test of what the business should have in the way of system is what would be required if the business were just being established. Only the most simple and direct methods of control would be initiated. If certain procedures were suggested in order that they might be adequate for handling several times current volumes, and if they involved hiring a staff to operate them until such increased business were obtained, the wise executive would certainly defer the installation of such procedures until increasing volume made them necessary. Why, then, is it not equally wise to simplify present systems to the same basis?

## Results to Be Obtained

The ramifications of paper work reach out from the placing of the order, through the purchasing, processing, shipping and invoicing of it. How many copies of the customer's order are written? How are they distributed? Where are they recorded? What incidental records do they involve? This is only the beginning. Usually each copy multiplies itself in other forms, until by the time the order is invoiced an amazingly large number of entries and writings have been made, each of which has involved a definite amount of expense. At the same time, or shortly afterward, another series of records are compiled to show the results of the operations from various angles and viewpoints. How many could be entirely eliminated, or by slight modification be made to serve in place of two or more other forms, without materially handicapping effective control? It is not unusual in a moderate-sized organization to effect an elimination of several hundred thousand copies of forms a year, with savings in clerical expense of from 20 to 40 per cent.

\* Director of budgets, Worthington Pump & Machinery Corp., Harrison, N. J., and director, New York Chapter, National Association of Cost Accountants.



# The Farmer Sees

**A** RECENT item in the Des Moines, Iowa, *Register* reports the experience of Albert Cornick at Mount Pleasant, a small Iowa village:

"Monday Cornick delivered 1500 bu. of two-year-old corn and 700 bu. of last year's oats to the elevator here and contracted to deliver 120 bu. of new wheat from the threshing machine Wednesday. He received 52c. for corn, 39c. for oats and 95c. for wheat. Cornick's check totaled \$1,167. If sold last winter, the same grain would have brought \$254."

This brief item is eloquent testimony as to why the grain farmer of the United States sees some hope for the future today, whereas only a few months ago he was a victim of despair and in a mood to resist, with physical violence if necessary, any arbitrary attempt to take from him by legal proceedings those possessions which he had struggled for years to keep.

## Higher Prices Plus Bonuses Improve Farmer's Status

The farmer already is getting back some of his purchasing power. It is true that in certain sections he has poor crops but on the whole he is much better off than in 1932. The estimated yield of corn, wheat, oats, barley, rye, flaxseed and potatoes, sold at July 15 prices, would bring \$748,000,000 more than the larger crops of last year sold at July 15, 1932, prices. Cotton is far above the price of a year ago, with its resulting benefits to the cotton farmer.

To restrict production of wheat and cotton the Government, under the provisions of its Agricultural Recovery Act, is to pay over \$100,000,000 to cotton growers and \$150,000,000 to wheat growers in the form of a bonus, two-thirds to be paid this fall and the remainder next spring. This program will put actual cash into the pockets of farmers who have long been sorely in need of cash.

Small wonder that the agricultural implement industry, ordinarily a large user of steel, is looking forward with confidence to an improvement in its business. The wire goods trade, which likewise finds the farm market a lucrative source of income, also is confident of a revival of buying in the farm areas as soon as crops are harvested and the Government has distributed its bounty. Fortunately the betterment doesn't stop at this point. It penetrates many industries, for the farmer likes modern conveniences as well as the urban dweller. He wants an automobile, a

radio and household electrical appliances (over 12 per cent of the country's farms now have electric power). Therefore this buying impetus of the American farmer is going to be felt by manufacturers in a multitude of lines. It already is registering increased sales for the general hardware store, particularly in heavy hardware products.

This is not to be interpreted as an indication that a miracle has happened and that the farmer, who has suffered for years from a depleted income because of low prices for his products, is definitely out of the woods. Far from it. He still has an uncomfortable debt burden. His taxes still are high. Although he is getting much more for his crops, prices of his live stock, his dairy products and his poultry are little better, in some cases even lower, than a year ago. And crops constitute only about 40 per cent of his income. The main point is that things are on the mend. He sees action at Washington in his behalf and knows that if the NRA program achieves even half of what it is designed to do, the purchasing power of the industrial worker will be aided so that the population of the cities will consume more bread, more meat, more milk and more of all kinds of farm products.

## Agricultural Prosperity a Fundamental Need

There are few who will dispute the assertion that the prosperity of agriculture is basic to general prosperity. When the gross farm income ranged from eleven to twelve billion dollars, as it did from 1923 to 1929 inclusive, a factory output of 60 to 70 billion dollars was marketed. In 1930 the farm income dropped to \$9,414,000,-

000, in 1931 to \$6,911,000,000 and last year to \$5,143,000,000. In other words, in 1932 farm income had declined to 45 per cent of that in 1926. While no comparable current figures for factory output are available, the index of total payroll payments on Jan. 1, 1933, stood as follows:

Industry	Per Cent of 1926
Meat packing .....	67.1
Men's clothing .....	31.3
Women's clothing .....	34.8
Iron and steel .....	21.4
Boots and shoes .....	40.1
Textiles .....	42.2
Jewelry .....	35.3
Cars, electric and steam railroad .....	10.0
Rubber products .....	36.6
Tires and inner tubes .....	31.5
Agricultural implements .....	18.9

From this table, based on figures of the United States Department of Labor, it is evident that only one of the above industries, meat packing, has been able to maintain a payroll in excess of 45 per cent of its 1926 payroll. It is a striking commentary on the fundamental position of agriculture in relation to industrial prosperity. The farm income, representing newly created wealth, truly governs industrial operations.

Many farm products have advanced materially from their 1932 quotations, which were the lowest during the depression. When compared with 1929, prices on July 15 of this year were surprisingly good in many commodities, particularly wheat, oats, barley, rye, potatoes and flaxseed, all of which closely approximated the rates of four years ago. On the other hand, prices of livestock and dairy products are continuing to hover around the depression level of a year ago. That the Roosevelt administration is applying the same restrictive

Value of Important Farm Crops in 1933 Compared With 1932—Computed on July 15 Farm Prices for Both Years

Production figures based on U. S. Department of Agriculture Statistics

Crop	1933			1932		
	Estimated Yield, Millions of Bushels	Farm Price, Cents	Value, Millions of Dollars	Actual Yield, Millions of Bushels	Farm Price, Cents	Value, Millions of Dollars
Corn .....	2,273.0	55.4	1,259.2	2,876.0	29.9	859.9
Wheat .....	500.0	86.9	434.5	726.0	35.6	259.5
Oats .....	667.0	39.1	260.7	1,238.0	17.5	215.7
Barley .....	158.0	47.6	75.2	300.0	24.6	73.8
Rye .....	23.1	78.1	18.0	40.4	22.0	8.9
Flaxseed .....	7.8	188.8	14.7	11.8	80.8	9.5
Potatoes .....	293.0	97.9	286.8	358.0	48.8	174.7
Total .....			2,349.1			1,601.0

# Way Out

By BURNHAM FINNEY  
Detroit Editor, The Iron Age



control to hogs that it already has to wheat and cotton is an augury of higher hog prices. Secretary of Agriculture Wallace's program calls for purchase by the Government of 4,000,000 pigs weighing 25 to 100 lbs. at 6c. to 9½c. a lb. and 1,000,000 sows soon to farrow, weighing a minimum of 275 lb., at market prices on the day marketed plus a bonus of \$4. Meat packers will process the swine and the meat be distributed free to the needy. The cost of the program, estimated at \$55,000,000, is to be met by a processing tax on hogs, effective Sept. 30. The Government hopes to raise hog prices 25 to 30 per cent by this method. If the plan succeeds, the farmer's financial status will be benefited further.

The dairy field offers perhaps the least encouragement. Milk, butter and eggs are about where they were a year ago, so far as prices are concerned, and the biggest hope for improvement in prices to a profitable level lies in increased consumption. It is believed that any increased purchasing power stimulated by the NRA will be felt immediately in improved sales of dairy products.

## Mortgage Burden Eased

Early this year probably the most serious difficulty facing agriculture was the tremendous burden of mortgage indebtedness contracted at a time when higher prices were prevailing. This acute situation has been materially eased through establishment of the Farm Finance Administration at Washington and by amendments made to the Federal Land Bank Law. Under this law, farm mortgages can be carried at as low as 4½ per cent, and for a period of five years principal payments are waived. Through this medium a considerable portion of pressing mortgage loans have been refinanced.

In addition to the Federal Land Bank, the Government has provided for production credit corporations to supply credit for production and operating purposes at low rates of interest. It can safely be said that no industry has available as complete

financing services as have been set up for agriculture.

Although the farmer still is afflicted with high taxes, the burden has been lightened in some measure. Frankly, no definite figures have been compiled on this subject. However, it is estimated in reliable quarters that

▲ ▲ ▲  
**THE farmer's financial status has been improved to the extent of nearly one billion dollars by advances in prices and by Government bonuses for restriction of production.**

**The farmer's mental attitude has been correspondingly improved. Despair has been replaced by hope, and hope is leading to purchases. Farm implements, automobiles, wire goods, radios, household appliances, heavy hardware and a multitude of other manufactured products made of iron and steel are beginning to feel the betterment in farmer buying power.**

his taxes have been cut about 20 per cent, or a saving of forty million dollars on the two hundred million dollars paid in 1929.

## No Turning Back from Mechanization

Now as to mechanization. There has been much loose talk about the fact that the farmer is going back to simpler methods of production and that he is turning away from the machinery built by implement makers. There is no real evidence to support such statements. Just because the farmer has been pinched for money in the last few years and has had to resort temporarily to the crude, slow and costly methods of yesterday is no more an indication of a permanent abandonment of advanced processes than is the relatively low volume of motor car sales an indication that the American public is going to re-

place automobiles with horses and buggies.

There are definite good reasons why the farmer has no intention of turning back the pages of time. In the first place, he couldn't if he wanted to, because animal power is rapidly diminishing. In 1920 there were 25,700,000 horses and mules on American farms; on Jan. 1, 1933, the number had declined to 17,100,000. The average age of horses as given by some authorities is in the neighborhood of 12 years, and there are not enough brood mares to produce a sufficient number of colts to take care of the natural decline.

Another reason why an increase in farm mechanization is inevitable is the premium put today on more economical production of crops. The Government might well lend its financial backing to the farmer so long as his methods are efficient, but it cannot long support wasteful, costly farming. What can be done in modernizing farm methods is shown best by a graphic example.

In Illinois and Iowa the average net bushel cost of producing corn (exclusive of land use) in 1932 was 22c., wheat 60c. and oats 17c., according to figures recently released by the United States Department of Agriculture. A farmer in eastern Illinois, whose figures were checked by the University of Illinois, turned out the same crops in 1932 at a cost of 11.9c. a bushel for corn, 18c. for wheat and 5.1c. for oats. He has 280 acres of crop land on his 336-acre farm and uses a general-purpose tractor, a combine and a corn picker.

## Farm Implement Industry Is Hopeful

In considering the volume of business in the next year for farm implement manufacturers, one must not overlook the effect of tapping a virtually new market. Heretofore the implement people have been satisfied to confine their efforts to machinery which is most economical and best fitted for the moderate-size or large farm. However, the economic exigencies of the day and the fact that tens

(Concluded on Page 66)

## Vertical Surface Grinder with Hydraulic Table Feed

**T**HE Gallmeyer & Livingston Co., Grand Rapids, Mich., is placing on the market a new hydraulic-feed vertical-spindle surface grinder for both toolroom and manufacturing use. Advantages of the hydraulic table feed are said to be the same as those of the more usual horizontal-spindle machines. Rapid table travel for roughing cuts and slower travel for one or more light finishing cuts are available. Speeds range from as low as 2 ft. per min. to over 100 ft. per min.

Grinding wheel drive is by a 5-hp. 60-cycle motor, with ample overload capacity, mounted directly on the spindle. The hydraulic pump is driven direct from a 1½-hp. motor located in the base of the machine. A detachable portable coolant system provides a copious flow of coolant, which is considered necessary for maximum production. The portable tank is placed on the floor positioned against the base of the machine. The cover of the tank carries a vertical ball-bearing motor, upon the shaft of which is mounted a spider-type vane pump. No bearings are under water, and no stuffing boxes are necessary. The tank has a vertical partition rising to within about 4 in. of the top, making the compartment into which the pump sets. An angular baffle plate extends from the top of the tank downward to within about 4 in. of the lower end. Abrasive particles settle at the bottom of the tank. Convenience

of cleaning is a feature of the portable tank; in cleaning, the cover with motor and pump mechanism is simply lifted off complete, and the tank detached from the machine and moved to a suitable location for dumping, flushing and refilling.

The wheel head with its motor and spindle assembly is a heavy, rigid unit designed to eliminate vibration and thus reduce wheel wear. To facilitate its movement up or down, when placing or removing work, a motor-driven power rapid-traverse mechanism is

supplied. A double-throw switch controls this movement. Automatic down feed, variable from 0.0001 to 0.0020 in. per stroke with automatic throw-out is provided.

The column and base of machine are cast integral to assure maximum rigidity. A one-shot lubrication system supplies oil to all bearings requiring it. The spindle is lubricated by grease from grease cups.

This machine, designated as the No. 3-V, is offered for grinding dies with guide pins in place, and also for miscellaneous toolroom grinding of such work as parallel, hardened washers, punches, and small flat dies. Parts ground economically on a production basis, before or after hardening, include gear blanks, disks, washers, and similar parts.

## Pickling Tank Construction Simplified

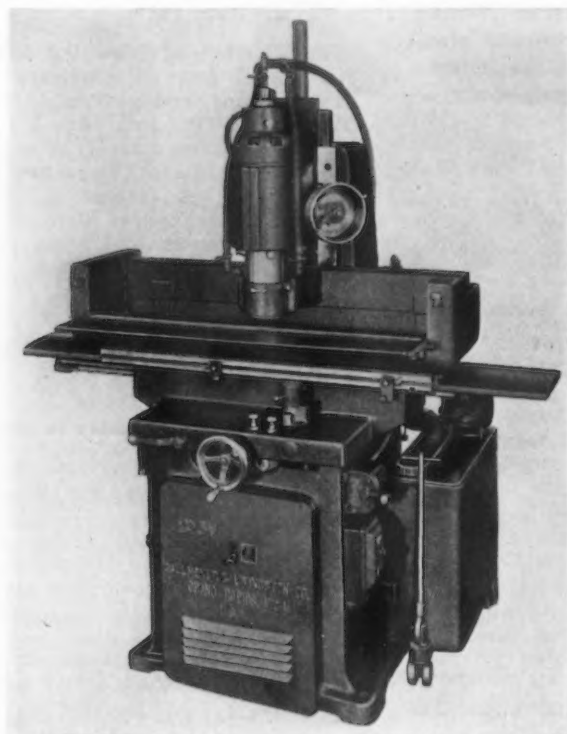
**A**PPPLICATION for patent has been made for a new type of acid-proof brick that is calculated to simplify the construction of acid pickling tanks. The bricks are designed especially for use with molten sulphur or special melting compound. In laying the bricks, no spacers are needed; a course is laid dry and then the joints are poured. Holes are provided for pouring and from these the melted material is led into cavities where it solidifies to form the joint. Beads on the outer edge of the brick confine the fluid and prevent its running down the face, thus eliminating the use of paper strips.

The patentee is C. Fred Sauereisen, president of Technical Products Co., of Pittsburgh, and the brick represents the result of experience in the development and application of acid-proof cements and melting compounds. With the new bricks, laying with poured joints eliminates the use of mortar and trowel.

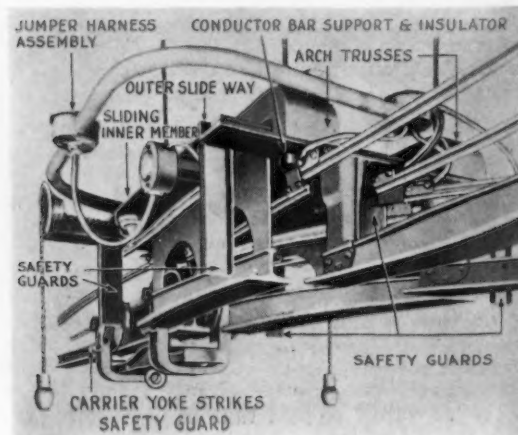
## New Switch Permits Closer Rail Spacing

**T**HE Tramrail Division of Cleveland Crane & Engineering Co., Wickliffe, Ohio, has brought out a new switch for use on Tramrail hand-propelled carriers, and for certain types of electrically operated carriers. The new design permits a closer switch grouping and rail spacing than is possible with the standard sliding type of switch.

The new Type D switch, here illustrated, is built entirely of rolled steel members with all joints welded. The rigid outer frame and a sliding inner member are fitted and so guided as



THE new vertical-spindle surface grinder employing a hydraulic table feed is shown on the left. Below is illustrated the more compact Tramrail switch.



to always maintain a proper alignment of the switch and incoming rails. The slide-way is protected from dirt contamination, and is provided with adequate lubricating fittings. Safety guides are welded to the switch frame to prevent the carrier from being run off the rail regardless of the position of the switch or carrier.

A Type E switch, similar to the Type D, has also been developed, and is suitable for extremely close grouping and rail spacing. It can only be applied to hand-propelled carriers, and the loads must not exceed one ton.

## Announces Line of Automatic Oilers

**A**UTOMATIC oilers of "constant level" and "thermal" types have been brought out by the Speedway Mfg. Co., Cicero, Ill. The constant level oilers are for use on electric motor bearings and other reservoir bearings with oil-ring, packing, or ball or roller bearings where oil in the reservoir should be maintained at a definite level. This is done by means of a tube which permits air to enter and oil to flow from the reservoir when the level of oil in bearing reservoir drops be-

low the fixed and proper level—automatically stopping the flow of oil when this level is attained.

The thermal oilers are designed for use on sleeve bearings of the open type; they are operated entirely by change in the bearing temperature. Heat in the bearing causes an expansion of the air in the thermal chamber, forcing small quantities of oil to the bearing. Both types of Speedway Oilers have a visible oil supply. In addition to automotive and controlled lubrication, savings of time, oil and equipment and prevention of damage to materials being processed are claimed for these oilers.

## Bending Rolls for Long Heavy Plates

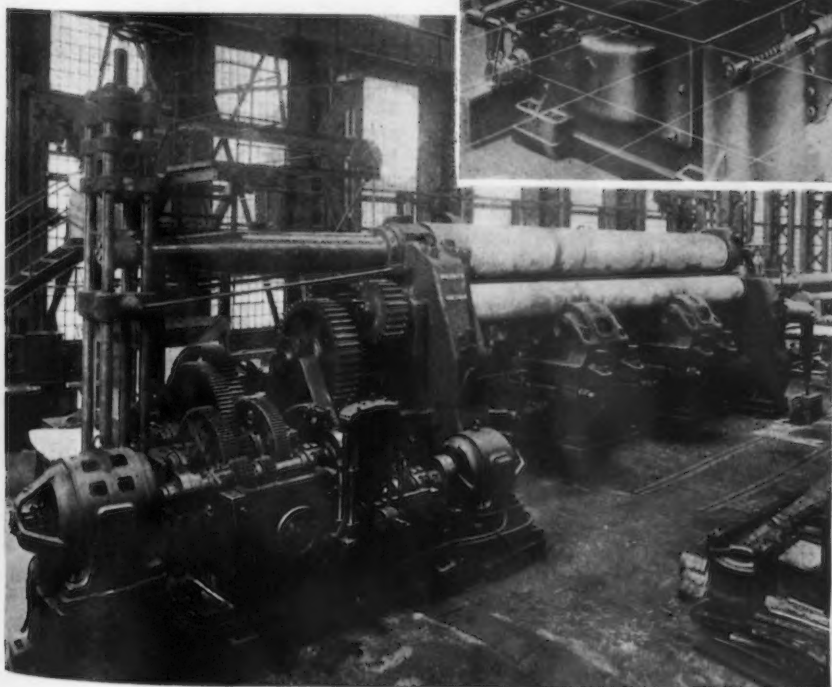
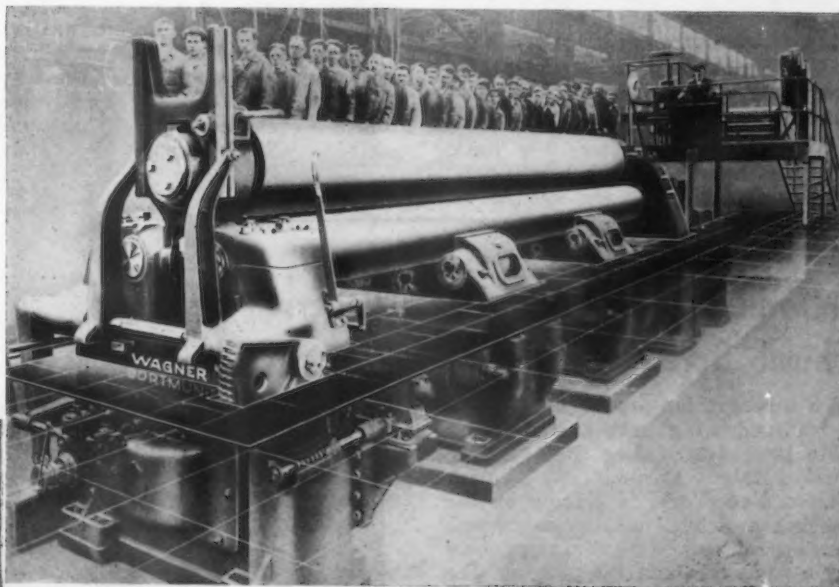
**F**OR bending plates in the manufacture of welded or riveted pipe and boilers, the machine shown in the illustrations has recently been built. It is of the three-roll type suitable for cold bending and is noteworthy for its size and capacity.

The machine can handle plate of 70,000 lb. per sq. in. tensile strength, in lengths up to 28 ft. and in thickness up to 1½ in. The minimum diameter to which the plate can be bent is 41 in. The top roll is 34½ in. in diameter and weighs 55 tons, while the lower rolls are 23½ in. in diameter, each roll weighing 23 tons.

One picture, with the housing covers of the gear box removed, shows the drive of the rolls and also the device for tilting the upper roll to remove the plate endwise after it has been bent. The view of the other end shows the arrangement provided for

removing the end bearing of the upper roll when the roll is to be tilted. The top roll is crowned, to give it greater resistance against bending. The two lower rolls are cylindrical and they are provided with two intermediate roller-type reinforcing supports.

A 170-hp. reversible motor provides the power. A 110-hp. motor tilts the upper roll and a 6-hp. motor operates the device which disengages the outer bearing from the upper roll, so that the latter may be tilted. Operations are controlled from a raised platform near the driven end of the rolls. A



**T**HE end bearing of the upper roll is removed by motor-driven mechanism when the roll is to be tilted; all operations controlled from the platform.

At the driving end (at left), from which the gear box cover has been removed, may be seen the device for tilting the upper roll to remove the bent plate.

large dial on the platform indicates the setting of the upper roll. For the initial bending of the edges of the plates before placing them between the bending rolls, a 385-ton hydraulic press is used.

The equipment was built by Wagner & Co., Dortmund, Germany, who in this country are represented by Marburg Brothers, Inc., 90 West Street, New York.

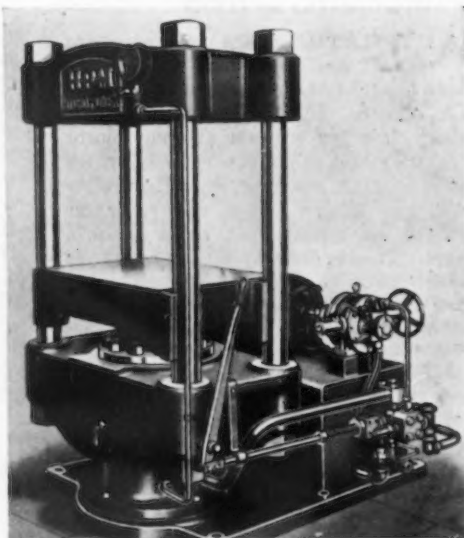
## Self-Contained Hydraulic Platen Presses

**T**HE Hydraulic Press Mfg. Co., Mount Gilead, Ohio, is introducing a new line of hydraulic platen presses equipped with individual hydraulic power plant, as illustrated. The H-P-M Hydro-Power unit which generates the operating pressure consists of a variable-delivery radial pump with direct-connected electric motor, mounted together, on an inclosed base, that contains the oil used as pressure fluid and lubricant. This unit can be mounted in any convenient location adjacent to the press at the side or rear.

The pressure exerted by the press and the speed of ram travel are subject to close automatic regulation through controls governing the output of the unit.

Advantages claimed for these machines as compared with conventional hydraulic presses operated from a central accumulator system include savings in installation cost and in floor space, and freedom as to location. The presses are available in ten different pressure capacities, from 25 to 500 tons, each with square or open side platens varying in increments of 12 in.

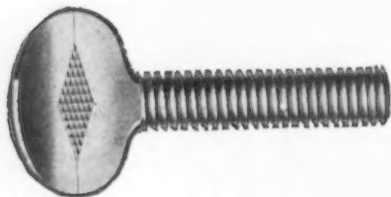
The illustration shows the basic



model mounted on a bed-plate with the hydraulic power unit at the rear. This type of press is suitable for many different types of forming operations and may be equipped with various types of pressing fixtures to extend its utility. A press of the same basic design but with an intermediate pressing platen is offered for plastic molding service; this press is equipped with die bolsters and ejectors for "semi-automatic" or fixed multiple cavity molds.

## Introduces Cold-Forged Thumb Screws

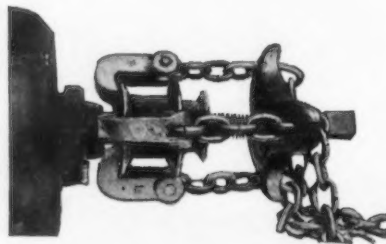
**A**S a companion product to its cold-forged wing nuts announced in THE IRON AGE of Aug. 25, 1932, the Parker-Kalon Corp., 200 Varick Street, New York, is placing on the market a line of cold-forged thumb screws, made, it is stated, in one piece by a new and improved process. The thumb grips are well proportioned, and being free from burrs and roughness they take a good plated finish. The knurling provides a firm finger grip. The screws are roll-threaded to close limits. These cold-forged



thumb screws are made for stock in a complete range of sizes from 3/16 in.—24 x 1/2 in. to 3/4 in.—16 x 3 in.

## Universal Gear and Wheel Puller

**W**IDE range of application is a feature of the Steelgrip universal gear and wheel puller illustrated,



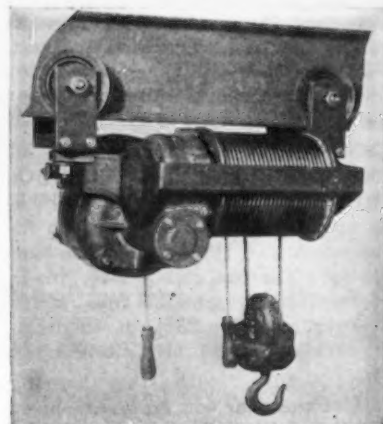
which is manufactured by Armstrong-Bray & Co., 308 Sheldon Street, Chicago. Consisting of a heavy bracket with large pulling screw and three chains, which may be of almost any length, the device will handle work at any distance from the end of the shaft. The chains are double ended, having standard chain hooks on one end for gripping spoked wheels or large gears and special hooks on the other for gripping bushings, small gears, motor pulleys, or for

use in close quarters. These universal pullers are made in two sizes, with pulling capacity of 12,000 and 36,000 lb., respectively.

## Compact Junior Model Electric Hoist

**A** NEW 500-lb. capacity Junior Model overhead electric hoist equipped with top hook for rigid overhead suspension or with a plain trolley for use on any monorail track has been placed on the market by Electro Lift, Inc., 30 Church Street, New York. The hoist is small and compact and may be readily moved from one location to another.

Like the company's standard 1/2 to 5-ton hoists, the Junior Model has

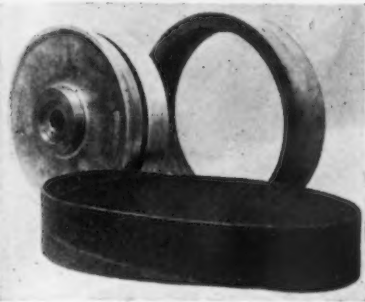


single worm drive featuring noiseless operation. Roller bearings are used throughout, all parts are inclosed, and gears and bearings operate in a bath of grease. The hoists are balanced at all loads, have steel suspension, and the motor brake and electric limit switch provide an automatic and positive stop to prevent over travel of the hook at the top of the lift. Either rope control or push-button control can be furnished.

**T**HE Merkle-Korff Gear Co., 213 North Morgan Street, Chicago, is placing on the market the Flexo-Action Auxiliary reduction unit here illustrated, which operates in conjunction with the company's small motorized reduction unit, and is applicable to any of the lower speeds up to 8 r.p.m. It is stated that the division of reduction has been carefully considered so that in most instances the torque available in the lower speeds can be delivered in such a manner that good performance is assured. The diameter of the final shaft is 1/2 in. Overall dimensions are: Height, 5 1/2 in.; depth, 5 in.; and width, 4 1/2 in.

## Turkish Emery Endless Polishing Sleeves

**E**NDLESS abrasive polishing sleeves coated with genuine Turkish emery for use with its expanding polishing wheels have been brought out by the Cleveland Container Co., Abrasive Division, 10830 Berea Road, Cleveland. The sleeves are made by the same process as that used in fabricating the company's aluminum oxide Nolap abrasive sleeves. In this process a web of plain drills cloth and a web of abrasive-coated cloth are fed



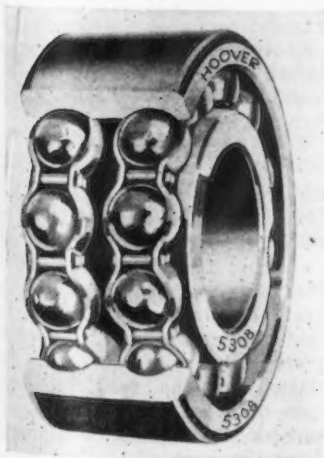
through an automatic machine to form a double helix, one within the other, and overlapping so that the seams are staggered. The new sleeves are extra heavily coated on a specially prepared drills cloth backing.

It is stated that with these new emery sleeves a high luster is obtainable on aluminum, steel and other metals. They can be used dry or with grease, oil, or emery cake.

## Hoover Company Offers Double-Row Ball Bearings

**P**RODUCTION of double-row annular ball bearings, made according to S. A. E. standards in the light, medium, and heavy series, designated as the Nos. 5200, 5300, and 5400 series, respectively, has been announced by the Hoover Steel Ball Co., Ann Arbor, Mich.

These bearings are of the deep-

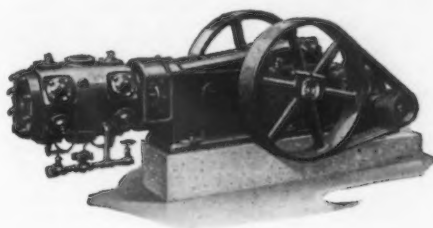


groove type, having no filling slots or interruption of raceways, which makes possible a large thrust capacity in either direction, in addition to the radial capacity. It is stated that special equipment designed for the manufacture of these bearings has made it possible to produce them so that each raceway in both the inner and outer rings are within minute limits of accuracy and of exactly the same characteristics, insuring each row of balls carrying its share of the total load, both from the standpoint of radial and thrust loads.

Formed steel retainers of the riveted type are used for spacing the balls, and the bearing in its entirety, is produced from electric furnace high-carbon chrome alloy steel.

## Compressor for Heavy Continuous Service

**T**HE Ingersoll-Rand Co., 11 Broadway, New York, has brought out a new single-stage, belt-driven compressor, designated as the class ES,



for heavy-duty service. This machine has one horizontal double-acting cylinder and operates at moderate speeds. It is available in sizes from 10 to 125 hp., and for discharge pressures from 5 to 150 lb.

The compressor is offered for use where full-load, continuous service is required. Low power cost is claimed, and the machine is said to give economical standby service for large compressors, the full capacity of which is not always needed. It is suitable for use in isolated plants where supervision is limited, for all applications where oil in the discharge line is objectionable, and for installations where a future change in pressure conditions may call for a change in cylinder size. It will handle poisonous or inflammable gases without leakage.

Low air speeds and small pressure losses are attributed to liberal design of air passages and valves. Effective water jacketing further assures low air temperatures, which simplifies lubrication and lengthens the service life of valves, cylinders and piston rings. A double-row of Timken roller bearings are employed on each end of the crankshaft to reduce friction and

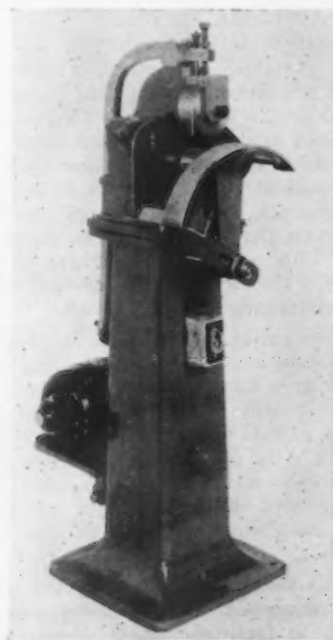
provide additional rigidity. Regulating equipment suitable for any conditions of service can be furnished.

## Molded Brake Linings Marked Rapidly

**F**OR rolling a permanent mark into molded brake linings by the use of steel marking dies, the Noble & Westbrook Mfg. Co., East Hartford, Conn., recently furnished the machine here shown. The mark consists of the customer's trademark and the size of the brake lining, which ranges from 3/16 to 1/2 in. in thickness and from 1 1/2 to 6 in. in width. The mark is rolled on approximately in the center of the piece.

Brake lining sections are placed in position on the special guide of the machine, and the marking die carries them forward automatically, rolls the mark in and ejects the piece. This is accomplished by using an eccentric die, with the trademark and size inserted on the high portion of the die. The die is built in segment form so that changes from one size to another may be made conveniently. The pressure roll above the marking die is of plain round form. Pieces are fed to the machine when the high portion of the marking die is down, which leaves the necessary opening for insertion of the pieces.

Adjustments are provided on the machine for marking different thicknesses of material and there is a compensating spring adjustment that takes care of variations in thickness of pieces of the same nominal size. Production is at the rate of 50 to 75 pieces per min., depending upon the size and diameter of the brake linings being marked.



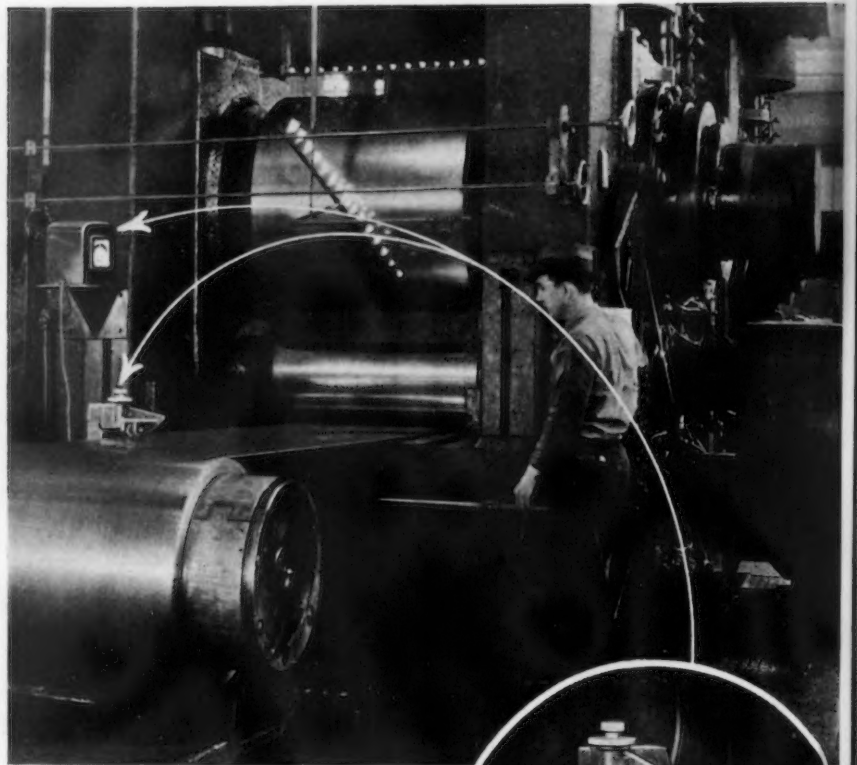
# Continuous Inspection of Sheet and Strip Metal

It is becoming more and more necessary to roll sheet and strip metal to accurately gaged thickness to meet manufacturing demands. The Pratt & Whitney Electrolimit Gage provides the necessary continuous inspection in a simple and efficient manner by passing the strip between two rolls, one of which actuates an electric head. These two rolls are hardened and precision ground, and contact directly with the strip, one on the upper and the other on the under side. The rolls are held in contact by spring pressure, and are forced together or apart by variations in the thickness of the strip passing between them. These variations in the distance between the gaging rolls are magnified by the electrical circuit of the Electrolimit Gage and are indicated on a micro-ammeter.

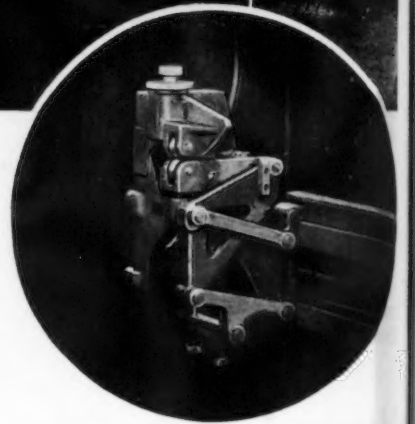
The gaging principle is quite simple, and is the result of combining the electrical ingenuity of the General Electric Co. with the gage-making experience of Pratt & Whitney Co. The movement of the gaging roll actuates an armature mounted between two coils in the electric head of the gage. Any movement of this steel armature upsets the balance of the magnetic field between these two coils, which produces a movement of the micro-ammeter needle. Electrical magnification is brought into play, so that variations from true strip thickness are shown clearly and instantly. Usually the upper roll has a relatively fixed mounting while the lower roll is held in a hinged mounting with an adjustable spring pressure to keep it in contact. The maximum opening between the gaging rolls is about  $\frac{3}{4}$  in. This allows irregularities in the edge of the strip to pass through without damaging the gage head.

The entire head is on a flexible mounting equipped with a spring balance or a suitable counter-balance so that it will follow the path of the strip as it is wound on the reel. Sometimes it is possible to eliminate this balanced mounting if an idler arrangement can be used that will keep the pass line constant as the reel loads.

The flexible head is mounted on a rail equipped with a screw adjustment to facilitate lateral positioning



A STRIP mill equipped with a Pratt & Whitney Electrolimit Gage arranged for continuously inspecting the thickness of the metal as it leaves the mill. The insert shows a closeup of the gaging mechanism with its two hardened and precision ground steel rolls, between which the metal passes, and which actuate the gaging mechanism. The entire instrument is mounted on a horizontal slide on the apron of the mill. This slide is equipped with a positioning screw and handwheel so that the gaging mechanism can be moved in or out. The thickness of the metal being rolled is clearly visible to the operator at all times on the micro-ammeter shown mounted on a bracket at eye level.



of the gage to accommodate various widths of strips. The head may be moved quickly into gaging position on the strip after the latter has been threaded through the mill and tension applied. The rail may be mounted on the apron of the mill, or on a separate pedestal mounted on the floor, according to the particular installation.

If desired a gaging head can be applied to each edge of the strip being rolled. In this case the mounting rail extends entirely across the mill, with positioning devices provided so that the heads can be moved in or out as needed.

The micro-ammeter, which reveals discrepancies in the strip thickness, may be located in any convenient place at the mill or at a central station or both. The micro-ammeter used is wholly unaffected by vibration, and can be read easily at a distance of 10 ft. Usually  $1\frac{1}{2}$  in. on the scale (total scale length is 4 in.) is equivalent to .001 in., with intermediate graduations for each .0001 in. The scale usually is graduated plus or minus from the center, and the magnification is controlled by a simple adjustment in the electric circuit.

In addition to having the micro-ammeter show variations from the required thickness, the gage may be supplemented by a signal arrangement. This may be an electric light or an electric horn or both, as the case may require. This signal will register when the maximum or minimum limits are reached.

If it is desired to have a permanent record of the results of any continuous inspection, a photo electric recorder is brought into use. This instrument produces a graphic record on a moving sheet of paper timed with the work being produced. This instrument is made by the General Electric Co.

Laws relating to employment agencies in the United States as of Jan. 1, 1933, are covered in Bulletin No. 581 of the United States Bureau of Statistics. It contains the new Federal Employment Service Law enacted during the current year and complete details of different State legislation on the subject. Copies may be obtained from the Superintendent of Documents, Washington, D. C., at 15c. each.



## THE NEWS OF THIS WEEK

### R. F. C. Planning to Apply Credit Lever to Bankers

WASHINGTON, Sept. 5.—With codification of most of the basic industries and many of the smaller ones completed, the National Recovery Administration has now turned to the supreme test of its mettle. Administration of the codes has become uppermost. "Effectuating" the policy of the Recovery Act lies ahead. Restoring employment and purchasing power, building up production and consumption in order to avoid going through what President Roosevelt has called the "economic hell" of last winter, is the great objective. Keeping peace between labor and industry is one of the outstanding problems. Boards already have been established to that end and with some success, though the frequency of labor troubles admittedly is a source of grave apprehension. Underlying these difficulties is an inevitable conflict between the deep-seated principles of the open and closed shop and by the very nature of the Recovery Act the latter has been given tremendous impetus.

The other immediate turn, however, is to the matter of financing industry. Industry finds itself in need of funds to meet rising costs brought about by code requirements for shorter working hours and higher wages. Manifestly the question has been under study by the Roosevelt Administration from the time the Recovery Act went on the statutes. It has been discussed frequently by officials, notably by Gen. Hugh S. Johnson, National Recovery Administrator.

Developed gradually, plans for financing are being brought to a focus, and it is reported the President soon will announce them. Moves to this end have already assumed rather specific form, and are designed to avoid excessive inflation. One of the efforts not yet overcome is to get banks to loosen their credit policy. If not successful,

broader Government loans are clearly in prospect.

Steps taken at the direction of the President by the Reconstruction Finance Corporation to aid industries operating under codes look to the setting up of so-called community mortgage companies which would become eligible to receive direct loans. Chairman Jesse Jones has declined to discuss proposed mortgage companies, but has indicated that individual business interests who are desirous of getting loans from the R. F. C. to finance increased costs arising from code operations stand ready to organize themselves into community mortgage companies with adequate security for loans.

Efforts to obtain credits from banks with many of these securities have not been successful. Banks generally have taken the position that the securities, while entirely sound, are insufficiently liquid. There has been a great deal of criticism from industrialists of the attitude of many banks nevertheless for failure to loosen up on credit. Mr. Jones has stated that information in the hands of the R. F. C. shows that banks as a whole have sufficient money for loans, but declared that "something is holding them back." It is his hope that bank credit will become freer with the pushing of the Administration's financing plan. Credit, in his opinion, can be loosened through an increase in the capital structure of banks by the issuance of preferred stock, but so far this prospect has not developed and has left to the Government the greater job of financing industry.

Tied in with the plan is a recommendation made last Saturday by Transportation Coordinator Joseph B. Eastman in a long statement directed to presidents of all the railroads of the country in which, among other things, he said there is

"so much deferred maintenance and other work which sorely needs to be done that this will not only help the country, but be the soundest of economy." The Eastman program, seeking to get the railroads back of the recovery program, urged the carriers to spend "every available dollar" to put men back to work, suggested Government loans under the National Recovery-Public Works Act for purchase of maintenance requirements. A similar suggestion was made recently by Mr. Eastman and emphasizes the fact that the Roosevelt Administration is making earnest effort to push employment and purchase plans with Government aid from the R. F. C. and the Public Works funds, which have been made available to the navy and other departments to launch large building programs, thus backing up activities of private enterprises with Government aid.

Mr. Eastman last Friday issued a statement in which he said he did not think the railroads should come under an N. R. A. code and in his letter to railroad presidents gave this as a reason that it made it "all the more important that the railroads play their proper part in the program of national recovery" by shortening working hours and spending "every available dollar."

### Plan Change in Name of Steel Treaters' Society

THE American Metals Society will be the new name of the American Society for Steel Treating if the recent unanimous resolution of the society's board of directors is ratified by the members. Reasons for the change of name, as mentioned by the directors, are: The society has extended its field far beyond the single aspect of steel treating; considerable confusion has arisen because of the implied limitations of the present name; the society's scope of activities includes a great proportion of non-ferrous as well as ferrous interests; the proposed name is in harmony with the society's purpose of

promoting the arts and sciences connected with the manufacture, treatment and uses of metals.

The resolution will be referred to the society's constitution and by-laws committee at the forthcoming annual convention in Detroit, Oct. 2-6, for putting into proper phraseology as an amendment to the constitution. This amendment will then be submitted to the entire membership by letter ballot and will become effective when ratified by a majority of the members. Since the first move towards the change of name came from the members themselves, and since the directors unanimously approve, it is felt that the membership will bring the name "American Metals Society" into official use by about Jan. 1, 1934.

## Coast Warehousemen Organize

The Pacific Coast chapter of the American Steel Warehouse Association, at its organization meeting held in San Francisco on Aug. 25, elected George W. Poole, vice-president of A. M. Castle & Co., as its first president. The chapter, with a membership including 35 key warehouses in California, Oregon and Washington, discussed the code as promulgated by the parent body and adopted tentative plans for functioning under its provisions.

Group division chairmen, who will also constitute the executive committee, were named as follows:

Hot-rolled steel—J. Roterson, A. M. Castle & Co., Los Angeles  
Sheet steel—H. E. Oliphant, Tay-Holbrook, Inc., San Francisco  
Tubular products—E. C. Ducommun, Ducommun Corp., Los Angeles  
Alloy and special steels—H. L. Simon, Foucar Ray & Simon Co., San Francisco  
Cold-rolled steel—George R. Borrmann, Borrmann Steel Co., Oakland  
Bolts, nuts and heavy hardware—E. Jungquist, Percival Steel & Supply Co., Los Angeles  
Stainless steel—H. E. Oliphant, Tay-Holbrook, Inc., San Francisco

R. D. Cortelyou, divisional secretary of the American Steel Warehouse Association, was appointed secretary-treasurer of the Pacific Coast chapter. He will continue to have his office at 218 Chronicle Building, San Francisco.

## M. A. P. I. Opens Washington Office

MACHINERY and Allied Products Institute is opening a branch office in Washington, D. C., under direction of Morris D. Stevens, who for many years was a representative of business interests at the national capital.

# Public Works Allocations Approaching \$1,500,000,000

WASHINGTON, Sept. 5.—A rivers and harbors program calling for the expenditure of \$70,000,000 and allotments amounting to \$9,274,185 to be expended largely for construction and repair work have

been announced by Public Works Administrator Harold L. Ickes. These allotments brought allocations totaling \$1,397,896,138 from the Public Works Fund of \$3,000,000,000.

The \$70,000,000 for rivers and har-

### Rivers and Harbors Projects Approved

Project	Work Proposed
<b>RIVERS.</b>	
Hudson River, N. Y., Troy to Waterford..	Dredging 12 ft. channel rectification
Alabama River, Ala. ....	Dikes to control channel
Black Warrior, Warrior & Tombigbee Rivers .....	Rock removal and snagging
Wolf River, Tenn. (Memphis Harbor)....	Dredge 9-ft. channel
Mississippi River (Ohio-Illinois Rivers) ..	Channel stabilization
Ohio River, Lock and Dam construction ..	Continue construction, Montgomery Island Rock and Dam
Ohio River, Open channel work.....	Widening and straightening 9-ft. channel, dikes, revetments and dredging
Cumberland River, Ky. and Tenn.....	Raise dams A to F
Green and Barren Rivers, Ky.....	Dredging channel necessary to place in operation lock under construction
Kanawha River, W. Va.....	Complete and place in operation two high lift locks and dams to replace 4 obsolete dams
Kanawha River, W. Va. (Lock 5 to mouth)	Construct locks for 2 high lift dams to replace 6 old dams in Kanawha and 3 dams in Ohio
Allegheny River .....	Complete the reconstruction of locks and dams Nos. 2 and 3
Illinois River .....	Dredging and improvement of facilities at locks
<b>OCEAN INLETS</b>	
East Rockaway (Deb) Inlet, N. Y.....	Dredging 12-foot channel
<b>INTRACOASTAL WATERWAYS</b>	
Cape Fear River, N. C., to Winyah Bay, Wty. ....	Dredging channel 8-feet deep and 75-feet wide
Cape Fear R., to Winyah Bay, S. C.....	Bridge construction
Waterway, Cape Fear R., N. C., to St. Johns River, Fla. (Winyah B. to Charleston Section) .....	Dredge 10-foot channel
Jacksonville to Miami Waterway.....	Complete 9-foot waterway
Louisiana-Texas Intracoastal Waterway..	Accessory works to put in operation 9-foot waterway, New Orleans to Galveston
Petit Anse, Carlin & Tigre Bayous, La. ..	Dredge 5- and 9-foot channels
Caloosahatchee River and Lake Okeechobee Drainage Areas, Fla.....	Levees and outlet enlargements
<b>GREAT LAKES CONNECTING CHANNELS</b>	
St. Mary's River, Mich.....	Deepening channels through Bayfield and Twin Island Shoals and dredging in channels and anchorage areas
Channel between Mackinac Island and Round Island, Mich. ....	Dredging a channel 27-feet deep and 1,250 feet wide
St. Clair River, Mich.....	Dredging, removing shoals
Channels in Lake St. Clair, Mich.....	Removal of center dike and dredging
Channels in Lake St. Clair, Mich.....	Dredging
Detroit River, Mich. ....	Dredging the downbound channels to project depths
<b>SEACOAST HARBORS—ATLANTIC</b>	
<b>New York Harbor:</b>	
Hudson River Channel, N. Y.....	Complete adopted 40-foot channel in North River
Hudson River Channel, N. Y.....	Further widen 40-foot channel below 59th Street
Bay Ridge and Red Hook Channels, N. Y. ....	Brooklyn frontage of New York harbor opposite transatlantic passage terminals and of channel entrance
East River, N. Y.....	Continue excavation of 40-foot New York Bay to Brooklyn Navy Yard, and 35-foot channel thence to Long Island Sound
Buttermilk Channel, N. Y.....	Removing shoal at junction of East River and channel between Governors Island and Brooklyn
New York and New Jersey Channel....	Anchorage Area at Perth Amboy
Cut-off channel Raritan River to Arthur Kill .....	Dredge channel 20 feet deep
Boston Harbor, Mass. ....	Enlarge 40-foot anchorage President Roads
Cape Cod Canal, Mass. ....	Construction of bridges and widen canal
New Haven Harbor, Conn. ....	Deepening main channel to 25 feet
Delaware River, Philadelphia to the sea..	Complete Philadelphia Harbor
Delaware River at Marcus Hook.....	Dredging anchorage
Delaware River, Philadelphia to Trenton..	Begin deepening channel to 25 feet to Trenton, N. J.
James River, Va. ....	Continue work on 25-foot channel to Richmond, Va.
Charleston Harbor, S. C.....	Widen entrance channel and extend channel to Ordnance Wharf

bors work to be done by the War Department was allotted in a lump sum for 90 projects. The list contains 13 river projects, seven intracoastal waterways projects, six great lakes connecting channels projects, 19 seacoast harbor projects on the Atlantic coast, 12 seacoast harbor projects on the Gulf, 11 seacoast harbor projects on the Pacific Coast, 17 harbor projects on the Great Lakes, three seacoast harbor projects in the Hawaiian Islands and one in Puerto Rico. Dredging, widening and straightening channels, construction of locks and bridges, excavation, breakwater

construction, dike building, etc., are included in the rivers and harbors projects.

The construction and repair work allotment to the Treasury Department includes \$8,501,190 for coast guard repair work and equipment. Of this total, \$4,500,000 is for the construction of three cruising cutters to be stationed at Quincy, Mass., Camden, N. J., and Newport News, Va.; \$1,650,000 for three cruising cutters at New York, Wilmington, Del., and Baltimore, and \$900,000 for four harbor craft at Bath, Me., New York, Wilmington and Baltimore.

## Witherbee, Sherman & Co. Reorganization Completed

WITHERBEE, SHERMAN & CO., Port Henry, N. Y., owner of iron mines and blast furnaces, has been reorganized as the Witherbee, Sherman Corpn. Officers of the new organization are as follows: Walter Brown, vice-president; J. A. Stevenson, Jr., secretary; R. R. Hughes, treasurer; A. K. McClellan, assistant treasurer and secretary, and A. M. Cummings, general superintendent. The presidency has not been filled. Directors are D. C. Borden, W. W. Ayres, K. M. Behr, L. W. Francis, S. D. Bowers, and Messrs. Brown and Stevenson.

The reorganization was undertaken to reduce fixed charges, principally interest, and to provide working capital. Interest charges of approximately \$400,000 a year have been eliminated and over \$700,000 made available as working capital.

The company's property, originally valued at \$20,000,000, includes extensive iron deposits in Mineville and Ausable, N. Y., as well as two blast furnaces and a sintering plant at Port Henry. One furnace is now in blast. The property was purchased for the bondholders under foreclosure sale at a price of \$530,000. The balance sheet of the new corporation shows current assets of \$762,000, and current liabilities of \$68,000. Investments in affiliated and subsidiary companies total \$552,000, and the property account is given as \$14,283,000. Preferred stock is valued at \$2,500,000, and the common stock equity is \$9,446,000.

## Bolt, Nut and Rivet Code Limits Capacity

A CODE of fair competition for the bolt, nut and rivet industry has been filed with the National Recovery Administration by the American Institute of Bolt, Nut and Rivet Manufacturers. In many of its provisions the code is practically similar to the iron and steel code.

Work hours are limited to an average of 40 per week in a six months' period and 48 hours and six days in any one week. Minimum rates for common labor are the same as in the steel code for the same districts. These range from 25c. an hour in the Southern district to 40c. an hour in several of the Northern districts. The minimum wage for office employees is \$14 per week, except for office boys and girls who are not to be paid less than 80 per cent of that wage.

Plant capacities cannot be increased as long as the demand can be met by existing capacities, but old and obsolete equipment may be replaced pro-

Project	Work Proposed
Brunswick Harbor, Ga. ....	Dredging bar channel
St. Johns River, Jacksonville to the ocean.	Straighten 30-foot channel to Jacksonville
Fort Pierce Inlet, Fla. ....	Maintenance of channels varying 25 to 22 feet including turning basin, jetties at entrance and revetments
Miami Harbor, Fla. ....	Enlarge turning basin
SEACOAST HARBORS—GULF	
Tampa & Hillsboro Bays, Fla. ....	Deepen and widen channels
St. Andrew Bay, Fla. ....	Deepen and realign entrance channel
Pensacola Harbor, Fla. ....	Dredge entrance channel and interior to depth of 32 and 30 feet respectively
Mobile Harbor, Ala. ....	Complete 36-foot bar channel
Gulfport Harbor & Ship Island Pass. ....	Dredging anchorage basin to a depth of 26 feet
Sabine-Neches Waterway, Texas. ....	Dredging to increase depth of entrance and interior channels from 33 and 30 feet to 35 and 32 feet
Galveston Harbor & Channel, Tex. ....	Dredging minor channels in harbor
Galveston Harbor to Texas City Channel, Tex. ....	Construction of 5,600 linear feet of rubble mound dike
Houston Ship Channel, Tex. ....	Dredging to increase depth of channel from 30 to 32 feet
Freeport Harbor, Texas ....	Dredging channel from Gulf to jetty entrance 32 feet deep, thence 30 feet to Brazos and Freeport
Port Aransas, Texas. ....	Deepening outer and inner channels from 33 and 30 feet to 37 and 35 feet, respectively
Brazos Island Harbor, Texas ....	Construction of jetties and dredging entrance channel
SEACOAST HARBORS—PACIFIC	
San Diego Harbor, California ....	Complete entrance channel 40 feet by 800 feet
Los Angeles & Long Beach Harbors, Cal. ....	Breakwater construction
Monterey Harbor, California ....	Breakwater extension
Richmond Harbor, California ....	Widen bends over 30-foot channel
San Joaquin River, Stockton Channel ....	Widen and deepen channel
San Francisco Harbor, Calif. ....	Deepen bar channel and remove shoals
Columbia River and Lower Willamette below Vancouver and Portland. ....	Dredging and dike construction to complete 35-foot channel to Portland
Columbia River and Lower Willamette below Vancouver & Portland. ....	28-foot channel and turning basins Port of Vancouver
Tacoma Harbor, Wash. ....	Training walls at mouth of Puyallup R.
Lake Washington Ship Canal ....	Channel 30 feet x 100-200 feet
Wrangel Narrows, Alaska. ....	Widening channel, deepening entrance, removing rock
GREAT LAKES HARBORS	
Duluth-Superior Har., Minn. & Wis. ....	Dredging channels and basins
Ashland Harbor, Wis. ....	Deepening channel and basin
Niagara River, N. Y. ....	Dredging 12-ft. channel
Agate Bay Harbor, Minn. ....	Dredging harbor
Calumet H. & R., Ill. and Ind. ....	Breakwater construction
Indiana Harbor, Ind. ....	Dredging outer harbor and canal
Cleveland Harbor, Ohio ....	Dredging outer harbor
Ashtabula Harbor, Ohio ....	Breakwater construction
Buffalo Harbor, N. Y. ....	Breakwater construction
Conneaut Harbor, Ohio ....	Breakwater construction
Lorain Harbor, Ohio ....	Deepening harbor
Marquette Harbor, Mich. ....	Deepening harbor from 22 feet to 25 feet
Port Washington Harbor, Wis. ....	Breakwater construction, deepening basin to 21 feet, entrance to 18 feet from 16 feet
Milwaukee Harbor, Mich. ....	Pay to city for dredging to be done to 21 feet in harbor at 10c. per cu. yd.
Ogdensburg Harbor, N. Y. ....	Deepening portion to 21 feet
Toledo Harbor, Ohio ....	Deepen channel to 25 feet and dredge 18 ft. anchorage basin 8.25 acres
Detroit River, Mich. ....	Dredging Wyandotte Channel to 21 feet
SEACOAST HARBORS—HAWAIIAN ISLANDS	
Honolulu Harbor, Hawaii ....	Dredging 40-ft. channel and enlarging harbor basin
Kannakakal Harbor, Hawaii. ....	Dredging 23-ft. harbor basin
Port Allen Harbor, Hawaii ....	Construct breakwater and dredge harbor
SEACOAST HARBORS—PUERTO RICO	
Mayaguez Harbor, P. R. ....	Dredging 30-ft. channel

vided the replacement does not increase capacities.

The present method of quoting on the basis of discounts is continued as well as the present basing points, which are Birmingham, Chicago, Cleveland and Pittsburgh. Provisions relating to the filing of prices are similar to those in the steel code. No member shall sell any item below his own cost of manufacture. No deviation from the recognized differential is to be allowed for shipment of broken container quantities. As in the steel code a discount of  $\frac{1}{2}$  of 1 per cent is to be allowed for payment within 10 days from date of invoice. Commissions to manufacturers' agents are limited to 5 per cent, including all expenses, and pool shipments with other products to secure lower transportation costs are forbidden.

No penalty is provided for not adhering to the prices filed or to any other violations of the code. However, any information furnished by a producer is to be subject to checking for the purpose of verification, and in case it is found that the producer has willfully misrepresented the cost of this investigation shall be assessed against the member who has made the misrepresentation. Administration of the code is to be under the direction of the Executive Committee of the Institute. The NRA administrator and one or two other persons appointed by him shall have the opportunity to take up with the Executive Committee any matters relating to the administration of the code.

## Pay Roll and Employment Indices Rose in July

THE index of employment in the United States rose to 67.3 during July, a 7.2 per cent increase over the June level of 62.8, as reported by the United States Department of Labor. The 46.5 July pay roll index shows a 7.9 per cent rise over the June level. The low point of employment at 55.2 was reached in July, 1932, when the low point for pay rolls, with an index of 36.2, also occurred. The indices of employment and pay rolls are percentages represented by the number of employees on weekly pay rolls in any month compared with the corresponding data of the base period which the Bureau has selected as 1926. The 12 month average of indices for 1926 represents 100 per cent.

During July the following industries reported percentage gains in operation over June: iron and steel, 13.9 per cent; automobile, 13.2 per cent; shipbuilding, 32.5 per cent; structural iron work, 8.1 per cent; cast iron pipe, 9.2 per cent; transportation equipment, 4.5 per cent; iron and steel forgings, 6.3 per cent.

## General Administrative Committee of the American Iron and Steel Institute

W. A. Irvin, president, United States Steel Corp., New York, chairman

Eugene G. Grace, president, Bethlehem Steel Corp., Bethlehem, Pa.

T. M. Girdler, chairman and president, Republic Steel Corp., Cleveland

E. T. Weir, chairman, National Steel Corp., Pittsburgh

L. E. Block, chairman, Inland Steel Co., Chicago

Hugh Morrow, president, Sloss-Sheffield Steel & Iron Co., Birmingham

W. J. Filbert, vice-chairman, United States Steel Corp., New York.



WILLIAM A. IRVIN



EUGENE G. GRACE



T. M. GIRDLER



ERNEST T. WEIR



L. E. BLOCK



HUGH MORROW



W. J. FILBERT

## German Tin Plate Exports Rise

THE steady upward trend in German tin plate exports which began in 1929 received a further marked impetus during the current year, according to advices from Consul Syd-

ney B. Redecker, Frankfort-on-Main, made public by the Commerce Department. Exports, he points out, which amounted to only 30,000 tons in the 1929 period had risen to nearly 82,000 tons in 1932.

During the first half of 1933, German tin plate shipments totaled 60,854 tons as compared with 37,000 tons

in the corresponding period of last year. The expansion this year, according to the report, has been due to gains in the trade with a wide number of countries, including Japan, the premier market, exports to which rose to 17,722 tons in the first half of this year from 14,347 tons in 1932.

Other countries for which notable gains were registered were Holland, Brazil, Italy, Mexico, Norway, Belgium, Portugal, Sweden, Argentina and Spain.

## Gray Iron Industry Did Well In July

ACTIVITIES in the gray iron industry improved sharply in July, according to the monthly report of the Gray Iron Institute. Production in July was 108.6 per cent of normal as compared with 94.7 per cent in June. New business increased to 136.8 per cent as against 118 per cent in June. Unfilled orders were 83.1 per cent of normal in July as against 68.6 per cent the previous month.

The New England district including New York and New Jersey operated at 102.2 per cent of normal in July as against 91.7 per cent in June. Plants in Pennsylvania, Michigan, Ohio, Indiana and the southern district east of the Mississippi River operated at 104.1 per cent as against 87.3 per cent the previous month. Operations in Wisconsin, Illinois and the territory west of the Mississippi River were 119.5 per cent of normal in July as against 109.4 per cent in June. The Chicago district increased its operations in July to 130.3 per cent of normal as against 95.02 per cent in June.

Conditions were reported good by 21 foundries, fair by 59, poor by 10 and bad by 2.

## Packaging Machinery Makers Organize

THE Packaging Machinery Manufacturers Institute, Inc., was completely organized at a recent meeting of the packaging machinery industry in Buffalo, at which about 75 per cent of the industry was represented. A code of fair competition was also prepared and approved unanimously and the institute was authorized to present the code to the National Recovery Administration. The meeting also gave the following committee appointed by the board of directors of the institute full power to act for the industry in presenting the code to the NRA: H. H. Leonard, vice-president and general manager Consolidated Packaging Machinery Corp., chairman; Col. F. K. Knowlton, president M. D. Knowlton Co., and Roger L. Putnam, president Package Machinery Co.

## Price Increases Offset July Wage Gains

AN increase of 10.2 per cent in employment in July over June was reported by the manufacturing plants included in the monthly survey of wages, employment, and hours of work conducted by the National Industrial Conference Board. This is the largest percentage gain in employment in the space of one month that has been recorded in the 13 years covered by the Conference Board's studies in this field.

It was the fourth successive monthly increase that has been reported by the Conference Board. The total increase in employment since February of this year is 19 per cent. The increase in the iron and steel industry in July was 13.4 per cent.

Man-hours have increased by an even larger percentage than employment. Average hours of work per employed worker increased from 41.2 hours per week in June to 42.6 hours in July.

As a result of longer working

hours, however, average weekly earnings increased from \$18.49 in June to \$19.15 in July, an advance of 3.6 per cent.

In spite of this increase of weekly earnings, individual purchasing power remained almost unchanged in July, as compared with June, because of a sharp rise in the cost of living, the index number of which computed by the Conference Board advanced 3.3 per cent from June to July. While, therefore, total purchasing power of the wage-earning population increased in July, as compared with June, because about 10 per cent more persons were added to payrolls, the purchasing power of the average individual worker remained practically unchanged, because his gain in actual earnings was offset by retail price increases. The purchasing power of the weekly earnings of the average worker in manufacturing industries, however, was 13.9 per cent higher in July than in February.

## Last Minute Sales Leads

(Received too late for classification in our Plant Expansion Section)

Richmond Brewing Co., Fifth and Main Streets, Richmond, Ind., has plans for new plant on 10-acre site, consisting of group of four, two and one-story units for brew-house, bottling works, storage and distributing plant, stock house, boiler and engine plant, and other structures. Cost over \$500,000 with equipment. Vonnegut, Bohn & Mueller, Indianapolis Trust Building, Indianapolis, are architects and engineers. Philip Stapp is president.

City Transit Department, 1 Beacon Street, Boston, asks bids until Sept. 19 for electrical and mechanical equipment for Boston ventilation building, traffic tunnel. Wilbur W. Davis is chief engineer.

Ohio Brass Co., Mansfield, Ohio, has secured contract for 235,000 porcelain disk type suspension insulators for 271-mile transmission line to be constructed by Bureau of Power and Light, Los Angeles, from city to Boulder Dam hydroelectric power plant, Boulder Canyon, Nev., totaling about \$450,000. Castings for insulators will require about 325 tons of malleable iron, and will be carried out at Mansfield works, while insulator units will be made at Barberton, Ohio, plant.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 18 for 25,000 lbs. soft steel wire, 100,000 ft. solid copper wire, 10,000 ft. switchboard wire, 50,000 ft. rubber insulated cable, 95,000 lbs. galvanized sheet steel, 12,000 lbs. cold rolled steel, 40,200 ft. wire rope, 2500 lbs. sheet copper, 1000 lbs. bar copper, 5400 ft. brass pipe, 85,500 lbs. common wire nails, 6000 lbs. wire finishing nails, 5000 lbs. flooring nails, 3000 lbs. galvanized roofing nails and other supplies (Schedule 2898).

Copeland Products, Inc., Mount Clemens, Mich., manufacturer of refrigerators and electric refrigerating systems, parts, etc., has been purchased from a creditors' committee, by Milton H. Morris, 306 South Michigan Avenue, Chicago, and associates. New owners will reorganize company and continue plant for same line of production, expanding capacity.

Common Council, Checotah, Okla., plans early call for bids for high service electric pumping machinery, pipe lines, and other equipment for extensions and improvements in municipal water system. Cost about \$65,000. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

Fort Dearborn Brewing Corp., 2074 First National Bank Building, Detroit, E. R. Stroh, president, recently organized, capital \$1,000,000, plans new multi-story plant at Schaefer Road and Schaden Avenue, consisting of several units for brew-house, bottling works, power house, storage and distributing plant, machine shop, etc. Cost over \$600,000 with equipment.

Village Council, Ashby, Minn., asks bids until Sept. 15 for pumping machinery, gate valves, hydrants, elevated steel tank and tower (alternate bid on wood tank), 8000 ft. 8-, 6- and 4-in. c.i. pipe, and other equipment for municipal waterworks.

Davidson Enamel Products Co., Lima, Ohio, operating a metal enameling works, has acquired former plant of Vitrified Iron Products Co., Clyde, Ohio, from a bondholders' committee, which recently purchased property at public auction. Plant has been closed since last December and will be occupied by new owner at early date for branch works.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 15 for three drilling and milling machines, and two precision horizontal boring, drilling and milling machines (Schedule 662-R) for Washington Navy Yard.

S. F. Bowser & Co., Fort Wayne, Ind., has been reorganized, following severance of refinancing contract with the Fuller-Johnson Corp., Detroit. Directors on Bowser board, representing Detroit company, have resigned and vacancies filled by Fort Wayne business men. Refinancing of the company is in progress.

# Demand Increasing for British Pig Iron and Semi-Finished Steel

LONDON, ENGLAND, Sept. 6 (*By Cable*).—Increasing demand for pig iron has necessitated lighting two additional blast furnaces and has increased the hopefulness of Cleveland producers. Continental competition in the home market has virtually ceased.

An advance in the price of pig iron is being discussed and when it occurs it will probably be accompanied by increases in ore and fuel.

Raw steel output has been stepped up to meet increased demand for semi-finished products. Ship and structural contracts are improving but rail orders are slack. Tin plates are dull with output at 65 per cent, which is well over the recent booking rate. Prices are well maintained. British works were successful in securing a large part of the Argentine Government contract for galvanized sheets for locust barriers. The inquiry was for 36,000 tons.

British demand for Continental semi-finished and finished steel is almost stagnant. Overseas demand for Continental products is improving, especially with Italy, Japan and Scandinavia.

## British Prices, f.o.b. United Kingdom Ports

Per Gross Ton			
Ferromanganese, export .....	\$9		
Billets, open hrth. \$5		to \$5 12s.	6d.
Black sheets, Japanese specifications .....	\$11		
Tin plate, per base box .....	16s.	6d. to	17s.
Steel bars, open-hearth .....	\$7 17½s.	to	\$8 7½s.
Beams, open-hearth. \$7 7½s.		to	\$7 17½s.
Channels, open-hearth .....	\$7 12½s.	to	\$8 2½s.
Angles, open-hearth .....	\$7 7½s.	to	\$7 17½s.
Black sheets, No. 24 gage .....	\$9		
Galvanized sheets, No. 24 gage...\$11		to	\$11 10s.

## Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £ at \$4.86			
*Ingots .....	\$2 5s.		
*Billets, Thomas. \$2 7s.			
Wire rods, No. 5 B.W.G. ....	\$4 10s.		
Black sheets, No. 31 gage, Japanese .....	\$11 5s.		
*Steel bars, merchant .....	\$3		
*Sheet bars .....	\$2 8s.		
Plates, ¼ in. and up .....	\$3 18s.	6d.	
*Plates, ⅞ in. and 5 mm. ....	\$4 1s.		
*Sheets, ¼ in. ....	\$4 6s.		
*Ship plates ..	\$4 10s.		
*Beams, Thomas. \$2 16s.		6d.	
*Angles (basis) ..	\$3		
Hoops and strip steel over 6-in. base .....	\$3 15s.		
Wire, plain, No. 8. \$5 7s.		6d.	
Wire nails .....	\$5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G. \$8 15s.			

\*Prices as established by European Raw Steel Cartel.

The raw steel cartel has revised C.I.F. prices because of depreciation of the franc and the dollar. The wire rod cartel meets in Luxembourg Thursday of this week.

Lorraine output has become satisfactory and the curtailment of working hours has almost ceased. German reports are more favorable and reveal increased business, but large export orders are still lacking.

## Fabricated Steel Plate Orders Dropped in July

WASHINGTON, Sept. 5.—Orders for fabricated steel plate declined to 20,058 tons in July, as compared with 37,020 tons in June, according to reports made to the Bureau of the Census by 48 identical concerns. Included in the July bookings were 6013 tons for oil storage tanks and 1884 tons for refinery materials and equipment, with miscellaneous requirements making up the bulk, or 11,417 tons. In the first seven months of the current year orders, totaling 119,442 tons, exceeded those of the corresponding period of last year when 104,656 tons was placed. Miscellaneous tonnage in the first seven months of 1933 totaled 63,422 tons while requirements for oil storage tanks amounted to 43,866 tons.

## Tantalum Carbide Tool Consolidation

VASCOLOY-RAMET CORPN. was formed Sept. 1 for the manufacture of all grades of tantalum carbide and the production of all kinds of tantalum carbide tools, dies, wearing surfaces, etc.

The new corporation consolidates the tantalum carbide manufacturing divisions of Vanadium-Alloys Steel Co., Fansteel Products Co., and Ramet Corp. of America. Headquarters of the Vascoloy-Ramet Corp. will be in North Chicago, Ill.

## Scrap Dealers Vote to Close Yards on Saturdays

AT a meeting of 25 scrap iron dealers of the New York Metropolitan district, held in New York, Aug. 28, all signed the President's Reemployment Agreement. The agreement has been modified by the code of the Institute of Scrap Iron and Steel, Inc., the labor provisions of which have been approved by General Johnson. The dealers voted to put the

Institute's code into effect in all scrap iron yards in this district on Tuesday, Sept. 5, and also voted to approve the present Institute's code. It was also recommended to the National Board of Directors that an amendment be inserted to require the closing of all scrap iron yards throughout the United States on Saturday.

## A. O. Smith Corp. Now Employs 4210

A. O. SMITH CORPN., Milwaukee, recalled approximately 200 workers during August, increasing the payroll to 4210. This represents additions aggregating 2800 made since March. Growth of the payroll has been due mainly to a general pickup in nearly all of its lines, according to Rae F. Bell, vice-president.

## Jeffrey Mfg. Co. Buys Traylor Vibrator Co.

THE entire patent, manufacturing and selling rights for all devices heretofore manufactured and sold by the Traylor Vibrator Co. of Denver have been acquired by The Jeffrey Manufacturing Co.

The Denver plant of the Traylor Co. has ceased to manufacture equipment. Hereafter the business will be conducted as the Jeffrey-Traylor Division of The Jeffrey Manufacturing Co. in Columbus, Ohio, where both mechanical and electrical parts of Jeffrey-Traylor units will be manufactured. James A. Flint, formerly vice-president of the Traylor Vibrator Co. will be in charge of the new division.

## Sale of Steel Plant Confirmed

COMMON Pleas Judge W. F. Lones, Lisbon, Ohio, has confirmed the recent sale of plant of National Drawn Steel Co., East Liverpool, Ohio, to the Potters' Saving & Loan Co., same place, for \$50,000, at a sheriff's sale, overruling a protest of the Bethlehem Steel Corp., which claimed an interest in the personal property. The latter company filed suit against the National company for \$269,982.44, based on a defaulted note for \$215,000 of December 15, 1930. The plant has been idle since October, 1932, with John W. Vodrey, receiver, in charge. Negotiations for early resumption of operations are under way.

"Wire Diameters for Mineral Aggregate Production Screens," is the subject of Simplified Practice Recommendation 147-33, recently issued by the Bureau of Standards. The recommendation became effective Feb. 1, 1933, and is subject to regular revision by a committee of the industry.



## THIS WEEK IN WASHINGTON

# The "Dead Cats" Begin to Fly

## Opportunism of Organized Labor Leaders Commencing to Show Its Consequences

**W**ASHINGTON, Sept. 5.—Boiling under the surface ever since the National Recovery Administration was set up, differences over its labor policies were dramatically brought to light with the resignation of Dudley S. Cates, assistant recovery administrator, last Thursday following an open break with Administrator Hugh S. Johnson. Mr. Cates, former vice-president of Marsh & McLennan, a Chicago insurance firm, from the outset had insisted upon the "vertical" union as the medium for negotiations between employers and employees. General Johnson declared he was in agreement that "with an industry organized vertically, the local labor organization is vertical also. However, he pointed out that the Recovery Act guarantees to employees the right of collective bargaining through representatives of their own choosing and added that he took that to mean "of no theoretical administrative choosing." Organized labor and the Labor Advisory Board naturally championed the side of General Johnson and challenged the view of Mr. Cates. In an interview, President William Green of the American Federation of Labor declared that Mr. Cates represented influences that have always been opposed by organized labor. Mr. Cates, he said, was an advocate of the company union. Mr. Cates over a month ago expressed a wish to leave, but remained at the request of the Administrator.

The resignation of Mr. Cates was the forerunner to plans for a general reorganization of the National Recovery Administration, partly because of growing internal dissensions, chiefly centered about labor policies, and also because the Administration has practically completed the first phase of its work and is now about to enter upon the task of reducing and consolidating its personnel preparatory to administering codes. The issues still disturbing the administration nevertheless are said to be troublesome and it

By L. W. Moffett

Resident Washington Editor, The Iron Age

has been intimated that now that he has returned to Washington President Roosevelt may take them in hand.

### Labor Disturbances Growing

There is much growing complaint that organized labor is increasing its domination over the policies of the administration and many industrialists are accordingly displaying greater concern over the fear that intensive drives to unionize industry will break down the open shop and extend with increasing rapidity the labor disturbances that have been spreading over the country. It is understood that even some officials in the ranks of organized labor are more disturbed than they care to let be known over the excessive activities of their agents to unionize industry. This concern is said to be due in part to the activities of agitators in radical labor organizations which are as bitterly critical of the American Federation of Labor as they are of "capitalism." It is also due to fear of public disfavor if trade unionism creates labor strife at this period.

The Federation's charge that Mr. Cates reflects the views of open shop employers is not supported by the memorandum which he recently addressed to General Johnson. On the contrary, he declared that "Any attempts to harmonize existing attitudes of open shop employers and federation leaders on the conventional doctrine of unionization is futile. To force the issue would precipitate a national crisis." He pointed out that abuses arising from the misuse of power and privilege on both sides are prevalent throughout the country.

It was the contention of Mr. Cates that each industry should be the unit

in establishing the field of collective bargaining, or "united action of labor and management under adequate government sanction and supervision" the sanction being the approval of a code of fair competition embodying labor agreements for the whole industry.

This, he added in the memorandum means a vertical union in each industry, free of domination or control either by employers or outside labor leaders. In another statement he maintained that trade unionism has become obsolete. Its swift revival under the Recovery Act does not justify Mr. Cates' observation. Organized labor supports the "horizontal" or national union, covering the same crafts in all industries.

In announcing the resignation of Mr. Cates, General Johnson paid tribute to him, and said that he had come to the National Recovery Administration at General Johnson's urgent request without compensation and at great personal expense, loss and sacrifice. Intimate friends for many years, differences of opinion on policy and interpretation of the law arose early between General Johnson and Mr. Cates and it was found impossible to reconcile their conflicting views.

It is understood that these differences reached an acute stage when Mr. Cates had the steel code before him and that the memorandum to General Johnson followed soon after.

The resignation of Mr. Cates came immediately after a conference he held with members of the Industrial Advisory Board. He was not in entire sympathy with policies of this Board though there was no indication that this particular conference developed any differences. The Labor Advisory Board, however, through Acting Chairman Green, president of the American Federation of Labor, issued a statement on the day of Mr. Cates' resignation which was interpreted by many to be directed at Mr. Cates. It sharply attacked the clause first put

into codes by the automobile industry insisting upon hiring and discharging of employees based upon their individual merit. The Labor Advisory Board statement said that misrepresentation compelled it to state "why it believes the N. R. A. would court disaster by accepting in codes so-called 'efficiency' or 'individual merit' clauses or other disguised anti-labor provisions." The board, it was stated, opposed this clause in one (automobile) code. It added that "Now it finds it in 29 other codes recently submitted." It was declared by the Board that "This clause will rise to plague the N. R. A. in the working of any code where its insertion is permitted." In conclusion, the statement made a brief, but pointed attack on the N. R. A. itself for permitting the clause to go into codes.

#### Craft Unions Obsolete

Mr. Cates had stated that he believed that instead of craft unions, such as bricklayers and iron workers' organizations spread through various industries, the proper form was unionizing of each industry under a code, with wage brackets for the more skilled crafts. Later, he issued a statement in reply to General Johnson in which he said that two months ago he told General Johnson and Secretary of Labor Frances Perkins that if it was the decided policy of the Administration to compel the unionization of industry throughout America there was, of course, no argument, but that if unionization of all industry was to result by inadvertence, he believed it would be a failure of statecraft.

Further on his statement added:

"The American Federation of Labor seeks to force unionization throughout industry and persists in misrepresenting the N. I. R. A. both here and in the field, to achieve that end. Forced unionization will not lead to 'united action,' but to strikes, violence and maybe civil war. Their program ought to be stopped and I have done my best at every turn to stop it.

"What I have opposed is forced unionization, namely, by intimidation, violence, or misrepresentation of the law. Men are being falsely told that they must join a union and in many cases are being threatened or attacked if they do not.

"The source of these methods is here in Washington and I have long urged upon General Johnson the importance of dealing with it, to the end that the major purpose of the N. I. R. A., which is putting men back to work at wages approved as fair by the National Recovery Administration, may be achieved.

"General Johnson is a conscientious and high-minded public official, and obviously believes that there is no way to meet the realities of this situation by the powers that lie within his administrative discretion. I disagree with him, because I believe that Section 7 of the act, providing for col-

lective bargaining, should be interpreted and administered in the light of the declaration of policy in Section I, which clearly calls for 'united action of labor and management.'

"General Johnson's statement that he is carrying out 'a decided policy of the President' closes the discussion as far as I am concerned. Had I known this to be the case I would never have ventured an opinion on the subject."

Gen. C. C. Williams, a deputy administrator, also is said to have come into sharp conflict with the Labor Advisory Board over the labor policy in connection with the boot and shoe code "individual merit" clause patterned after the automobile code clause.

The first resignation in the administration was that of Prof. William F.

Ogburn, who abruptly ended his services as a member of the Consumers' Advisory Board because of disagreement with Mrs. Rumsey. Professor Ogburn has returned to the faculty of the University of Chicago.

General Johnson has indicated that he will not at present fill the vacancy caused by Mr. Cates' resignation. He is concentrating on reorganization of his staff now that codes for most of the basic industries have been submitted, with some in operation, thus drawing the Administration further into the field of administering codes. However, the open and closed shop issue in halting some codes, notably that of the bituminous coal industry. Likewise it is obviously one of the outstanding reasons why Henry Ford is balking on joining the automobile code.

## Copper and Brass Mill Code Amended In Conference

WASHINGTON, Sept. 5.—Conferences between industrial, labor and consumer advisers resulted in the adoption of an amendment to the code of the copper and brass mill products industry, one of which increased the minimum wage rate for male employees from 35c. to 40c. per hour and for female employees from 30c. to 35c. Where women do the same work as men they will receive the same rate of pay as that allowed male employees.

The amendments were adopted following the morning hearing last Thursday before Deputy Administrator H. O. King of the National Recovery Administration. The increased hourly rates will apply unless the rate of July 15, 1929, was lower, in which event the new rate shall not be less than 30c.

The minimum hours provision, fixing a 40-hr. week, was left in the code with a proviso that employees should not work more than 8-hr. in any one day. Another amendment prescribes time and one-half for overtime in excess of 40 hr. per week, instead of time and one-third as provided in the code when first presented. Another amendment struck out a section prohibiting the "malicious enticing away" of employees by competing manufacturers.

Thomas A. Hammer, speaking for the National Council of Secondary Raw Material Associations, suggested an amendment which would authorize copper and brass mill products manufacturers to publish the prices they will pay for scrap. In reply to questions to Deputy King, Mr. Hammer said that the purpose of the amendment was to enable scrap metal deal-

ers to sell their products at any price they saw fit, as they had been doing for years.

Opposition to the amendment was offered by R. L. Coe, representing the Copper and Brass Mill Products Association. Mr. Coe said the purpose of the code provision was to prevent the indirect cutting of prices of brass and copper products by manufacturers through the device of paying higher prices for scrap repurchased from their customers. He explained that the manufacturers must have scrap in order to turn out their products and that they buy back a great deal developed in the course of manufacture by customers. In view of the fact that members of his association must have scrap metal, Mr. Coe stated, they are bound to publish prices which will enable them to get it.

Clark S. Judd, also representing the Copper and Brass Mill Products Association, one of the first witnesses, said that since the first of the present year 6500 men have been added to the payrolls of the copper and brass mill products industry. It was stated that approximately 4200 were employed on account of increase in business. The remaining 2300 were employed after the industry signed the President's Reemployment Agreement. On Aug. 15 of the present year the total number of employees was said to have been 23,782, compared with an average of 28,324 in 1929. When the industry goes under a code it was estimated that approximately 24,000 mill workers and 2000 office workers will be affected.

Deputy King asked how the industry justified the proposed minimum wage of 35c. per hour while now pay-

ing 38.1c. Mr. Judd said that the latter is an average, with many below and many above it. Mr. King observed that no provision is made in the proposed code for an equitable adjustment of the wages of higher class employees. Mr. Judd replied that it is difficult to classify them and that an attempt to fix a minimum wage for the higher classifications would be rather futile. In this connection he pointed out that operations include brass rollers, hot or cold, strip or sheet, etc., with pay scales ranging from 50c. to 80c. per hour. To set a minimum for that class, it was stated, would get nowhere.

"In fact," said Mr. Judd, "any one in the industry who attempted to gyp his higher class employees out of what was coming to them would commit industrial suicide. I think manufacturers would be much more inclined to subsidize them because it is hard to get experienced specialists."

John A. Coe, president of the association, in presenting the code, said the association represents 95 per cent of the production and 97 per cent of the employees in the industry.

## Ohio Coal Freight Rates May Rise

WASHINGTON, Sept. 5.—Rates on coal from numerous mines owned by Ohio iron and steel companies will be increased from 13c. to 30c. per net ton if the Interstate Commerce Commission approves a report made by Examiner R. N. Trezise. The present rate of 77c. per ton from Colona and Conway, Pa., to Youngstown would be increased to 90c. Ex-river rates from points on the river division of the Wheeling & Lake Erie Railroad to Cleveland, Lorain and South Lorain, Ohio, would be increased from \$1.10 to \$1.40. The points of origin, all in Ohio, are Brilliant, Martins Ferry, Mingo Junction, Rush Run, Salt Run, Steubenville, Stringer, Terminal Junction, Tiltonville, Warrenton and Yorkville. The present rate of 95c. would be increased to \$1.15 for shipments to Canton and Massillon of ex-river coal originating at mines on the Monongahela, Allegheny and Ohio rivers. The rates cover coal transferred from river barges or boats to railroad cars, when for track delivery at destinations.

The case has been before the commission three times. Steel companies have strongly urged reductions in rates. Indicative of their position was the request that the Colona-Conway-Youngstown rate be cut to 50c. a ton. The coal movement involved in the case is extremely large and higher rates will obviously mean a considerable increase in the cost of making coke, pig iron and steel.

## News of Codes in Metal Industry Divisions

WASHINGTON, Sept. 5.—The modified code of the heavy forging industry provides for a 40-hr. week, with minimum wages ranging from 25c. an hour in the southern districts, and 27c. an hour in the Birmingham district, to 40c. in northern districts.

Maximum hours of 40 per week for factory workers, except outside classifications, not more than 8-hr. in any one day and 10 per cent tolerance for engineers, electricians and repair and maintenance crews are set up in the modified code for the construction equipment distribution industry.

The non-ferrous foundry industry's code has been modified to provide for maximum hours of 40 per week for employees other than factory workers, averaged over a 4-wk. period, not more than 48-hr. in any one week; for factory workers and technical workers now receiving \$35 per week, 40-hr., averaged over 8-wk., and not more than 10-hr. in any one day and time over 8-hr. per day considered overtime; for engineers and others a 10 per cent tolerance. Minimum wages for factory workers are fixed at 35c. an hour for males and 35c. for female in the north and not less than 30c. in the south for both males and females; apprentices, 60-day period, 80 per cent of the minimum.

The modified code of the solid section steel window industry provides for a maximum work-week of 36-hr., averaged over four weeks, for factory workers, and not more than 42-hr. in any one week, nor more than 8-hr. in any one day.

A work-week of 40-hr., averaged over eight weeks, and not more than 44-hr. in any one week or 8-hr. in any one day, is provided in a modified agreement in the code of the crucible industry.

The alloy casting industry has been granted permission to change its code of fair competition relating to hours of work. The substituted provision calls for a maximum week of 40-hr., averaged over eight weeks, for factory or mechanical workers, except those receiving over \$35 per week. No such employees shall be employed more than 48-hr. in any one week, nor more than 8-hr. in any one day. Maintenance crews in emergencies will receive time and one-half for overtime. Engineers, firemen, shipping and outside crews and cleaners will be allowed a 10 per cent tolerance based upon the maximum prescribed.

The chain industry code has been amended to provide an hourly rate of pay of 40c. for male factory workers and 30c. for female workers, except where the latter do substantially the

same work as male workers they are to receive the same rate as male workers. Learners during a six weeks' period are to be paid not less than 80 per cent of the male rates and shall not constitute more than 10 per cent of the total number of employees.

The steel warehousing revised code provided a 40-hr. week for factory or mechanical workers except that for three weeks in a six-months' period the maximum may be 48-hr., but not more than 8-hr. a day. The hourly rates of pay are 37½c. in a trade of more than 500,000 population; 36¼c. in an area of between 250,000 and 500,000 population and 35c. in an area of less than 250,000 population. No distributor will reduce the hours of any warehouse or service operation to below 52-hr. per week unless they were less than 52-hr. per week before July 1, 1933. In the latter case hours will not be reduced.

Modification of the President's Re-employment Agreement has been made for the coke manufacturing industry to read as follows: Basic work week, 40-hr.; minimum wages, 40c. unless lower than that on July 15, 1929, and not less than 30c., except in Jefferson County (Birmingham), Ala., 27c.; elsewhere in south, 25c.

For the aircraft manufacturing industry the agreement has been modified so as to provide a 40-hr. week, but not more than 48-hr. in any one week. Minimum wages, 40c. unless employees were receiving less than that July 15, 1929, and in no event less than 30c.; overtime, time and one-third; learners, 80 per cent of minimum.

The code of the Institute of Scrap Iron and Steel, Inc., provides for a 40-hr. week, 8-hr. day for employees receiving \$35 or less, except for truck drivers, for whom a work week of 48-hr. is provided. The rate of pay for factory or mechanical workers is 37½c. in the north, 27c. in the Birmingham district and 25c. in other sections of the south.

An increase of 19 per cent in employment is estimated for the buff and polishing wheel industry under the President's Reemployment Agreement approved by National Recovery Administrator Johnson, providing for a maximum work week of 40-hr. for factory or mechanical workers and artisans, with the usual exceptions, such employees not to be worked more than 8-hr. in any one day. The minimum wage is fixed at 32½c. per hour, apprentices to receive not less than 80 per cent of the minimum for a 60-day period and not to exceed 5 per cent of the total number of employees.

The modified agreement of the aluminum industry fixes a maximum work week of 40-hr. over a 10-week

period with a proviso that employees engaged on continuous process operations may work 42-hr., no employee to work more than 48-hr. in any one week or more than 10-hr. in any one day. Minimum wages are fixed at 35c. per hour in the north and 30c. in the south for male employees with a 30c. rate in the north for female work, except where they perform the same class of work as men, when the rates shall be the same.

The modified agreement of the steel tubular and firebox boiler industry provides a maximum work week for factory workers of 35-hr., with a minimum hourly rate of 35c. in the north and 30c. in the south.

The modified agreement of the nickel alloy industry carries a 40-hr. week, with minimum hourly wages of 40c. or the July 15, 1929, rate.

## Code Submitted for Oxy-Acetylene

WASHINGTON, Sept. 5.—Manual laborers in the oxy-acetylene industry would be paid 40c. an hour in the New York metropolitan area under the code of fair competition presented to the National Recovery Administration by the National Oxygen and Acetylene Association. In all other places the 40c. rate would be adjusted downward as warranted by lower living costs as determined by the Department of Labor and Department of Commerce for the five years ended Dec. 31, 1932, but in no event less than 35c. With the usual exceptions the work week would not be more than 40 hours over any period of six weeks and in no event more than 48 hours.

The code carries a labor clause providing that nothing in it shall prevent the selection, retention and advancement of employees on the basis of their individual merit, without regard to their affiliation or non-affiliation with any labor organization. The National Oxygen and Acetylene Association, an affiliate of the International Acetylene Association, is named as the agency for supervising the code.

## Road Machinery Code Asks 40-Hr. Week

WASHINGTON, Sept. 5.—Makers of road machinery, in the code of fair competition submitted to the National Recovery Administration, provides that no one in the industry "shall work more than 40 hours a week on a semi-yearly average, or more than 48 hours in any one week." Employees living in cities of over 500,000 are permitted a minimum weekly wage of not less than \$15; in cities between 250,000 and 500,000, a minimum of \$14.50, and in cities be-

tween 2500 and 250,000, \$14, the remainder to get a raise of 20 per cent, provided this does not amount to more than \$12.

The code also provides for a peak production allowance of 48 hours per week, with time and one-half for overtime. A mandatory provision states that every employer shall raise the hourly and base rates for piece work up to 85 per cent of the 1929 level. The trade practice section prohibits selling below cost, which is defined as "labor, materials, all overheads, selling, collection, distribution and delivery expense."

## Cement Code Hearings Start Sept. 15

WASHINGTON, Sept. 5.—Hearings of the code of fair competition for the cement industry submitted by the Cement Institute will begin on Friday, Sept. 15, in the caucus room of the Senate office building. Deputy Administrator Malcolm Muir will preside. The code proposes a maximum work week of 36 hours, averaged over each half calendar year, with permission to work a maximum of 42 hours in any given week, with certain exceptions. Minimum wages are fixed at 40c. per hour in 10 and 12 geographical districts in which the country has been divided, and 30c. per hour in the two remaining districts. A rate of 38c. is provided in two Kentucky counties, and a rate of 37c. is fixed in two Minnesota counties.

## Navy Advertises for Equipment Bids

WASHINGTON, Sept. 5.—Secretary of the Navy Claude A. Swanson has announced expenditures and orders placed by the Navy Department during the week ended Sept. 2 from funds allocated under the National Industrial Recovery Act.

Advertisements for bids for material on account of naval vessels to be constructed include the following:

Sept. 15: Three horizontal precision type drilling and milling machines and two horizontal precision type boring, drilling and milling machines, at estimated cost of \$65,290; 88 air-cylinder, copper-nickel alloy forgings and 88 machine-finished plungers, at estimated cost of \$47,256; eight electric motors, eight starting resistances and four sets of spare parts, at estimated cost of \$12,400; two motor-driven milling machines at estimated cost of \$7,200; one hydraulic-operated, ram-spur gear tooth grinder, at estimated cost of \$6,000; 227 phosphor bronze, and 235 steel shells, at estimated cost of \$35,465; 296 steel afterbody shells, at estimated cost of \$28,616; 750,000 lb. of black and gal-

vanized bar steel at estimated cost of \$29,475.

Sept. 19: Four low-pressure compressor sets and spare parts, at estimated cost of \$17,370; 64 steam-jacketed kettles, at estimated cost of \$6,180; 1475 lb. of corrosion-resisting steel tubing, at estimated cost of \$1,710; 14,900 lb. of corrosion-resisting steel rollers at estimated cost of \$8,450; 200 frictionless trunnion roller bearings at estimated cost of \$10,000.

Sept. 22: 61,680 aluminum cart-ridge tanks and three gages at estimated cost of \$439,560.

The statement details contracts already awarded by the Navy Department in connection with its building program and also sets forth contracts awarded by the Newport News Shipbuilding & Dry Dock Co., the New York Shipbuilding Co., and the Electric Boat Co., for equipment and materials for vessels they are to build for the navy. There will be advertised for contract work at Pearl Harbor projects amounting to approximately \$3,000,000 as soon as minimum wage rates for Hawaii have been set.

## Anti-Friction Bearing Code Submitted

WASHINGTON, Sept. 5.—The code of fair competition submitted to the National Recovery Administration by the Anti-Friction Bearing Manufacturers' Association provides for a 40-hour week for factory employees, averaged for the period from the effective date to the expiration date, with not more than 48 hours in any one week. Minimum wages of factory employees for adult males are fixed at 40c. and for employees over 16 and less than 21 and to female factory employees at 30c. Wages for factory trade apprentices are fixed at not less than 20c. Any employer located in a section where a lower minimum rate has been prescribed and accepted by the President in the code of another industry for employees in the same crafts or classification of labor employed in the anti-friction bearing industry is given the right to employ such crafts of labor at such lower rate. The association is designated as the agency for administering, supervising and making the necessary rules and regulations for the enforcement of provisions of the code.

## U.K. Exempts 60 Per Cent Nickel-Copper Alloys

WASHINGTON, Sept. 5.—Effective Sept. 2, nickel-copper alloys containing 60 per cent nickel by weight were added to the free list on imports into the United Kingdom, according to a cablegram received by the Department of Commerce from the commercial attache in London.

# Proposed General Code of Fabricated Metal Products

**F**ABRICATED Metal Products Federation, formation of which was announced in a previous issue of *THE IRON AGE*, has submitted its basic code for the fabricated metal products industry.

Like the Machinery and Allied Products Institute, which is a "covering" association for a large number of smaller groups among machinery and equipment builders, the Fabricated Metal Products Federation will consolidate a large number of groups which manufacture metal products which are beyond the point of finished milled shapes or foundry operations and which may be too varied and general for classification in a separate code. Supplementary codes for specific groups having similar trade practice problems are contemplated.

The address of the Federation is 729 15th Street, N. W., Washington. Acting officers and board members are as follows:

H. D. North, Chairman, president Ferry Cap & Set Screw Co. Harry S. Kimball, Secretary-Treasurer, R. E. Pritchard, vice-president The Stanley Works. H. G. Donham, United Shoe Machinery Co. W. M. Goss, secretary The Scoville Mfg. Co. Alexander Watson, Youngstown Pressed Steel Co. Wm. D. Disston, Henry Disston & Sons. G. B. Durell, American Fork and Hoe Mfg. Co. A. E. Payson, Insulated Container Association. A. M. Ferry, Wire Cloth Mfrs. Association. H. R. Naylor, vice-president Pressed Metal Institute. A. E. Alverson, president American Hardware Manufacturers Association. Arthur E. Swanson, Screw Machine Products Association. D. S. Hunter, trade executive. Irving S. Paull, Institute of Cooking & Heating Appliance Mfrs., Inc. Stuart J. Swenson, Aluminum Wares Association. Geo. P. Byrne, United States Machine Screw Service Bureau.

The proposed code of the federation is as follows:

## A Basic Code of Fair Competition for the Fabricated Metal Products Industry

To effectuate the policy of Title I in the National Industrial Recovery Act, the following provisions are established as a code of fair competition for the Fabricated Metal Products Industry:

1. **DEFINITION:** The term Fabricated Metal Products Industry, hereafter referred to as the Industry as used herein, is defined to mean the manufacture for use or for sale of metal products which are beyond the point of finished milled shapes or foundry operations, and which may, for practical administration of National Recovery Act, be too varied and general as to be defined and classified specifically in a separate code, but which products can be classified in sub-division of this particular industry as provided for herein.

The term "person" used herein shall include natural persons, partnerships, associations and corporations.

The term "employer" as used herein

shall include every person engaged in the manufacture for use or for sale of the products of the Industry as herein defined, provided, however, that organizations or groups of employers representing a substantial part of any branch or sub-division of the Industry may be exempted by the Administrator from the provisions of this Code as provided for herein.

The term "effective date" as used herein is defined to be ten (10) calendar days after this Code shall have been approved by the President of the United States.

2. As required by Section 7 of Title I of the National Industrial Recovery Act, the following provisions are conditions of this Code:

"(1) That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from interference, restraint or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organization, or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection; (2) that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining, organizing, or assisting a labor organization of his own choosing; and (3) that employers shall comply with the maximum hours of labor, minimum rates of pay and other conditions of employment, approved or prescribed by the President of the United States." Nothing in this Code contained shall affect the right of employers to select, retain and/or advance employees on the basis of individual merit, without regard to affiliation with any organization.

3. On and after the effective date, employers shall not employ anyone under the age of 16 years, provided however, that where a State Law provides higher minimum age no person below the minimum age of said State Law shall be employed in that State.

4. On and after the effective date, the

minimum wage that shall be paid by any employer to any employee engaged in the processing of products of the Industry and any labor incident thereto, shall be 35c per hour for males, and 30c an hour for females, unless the hourly rate for the same class of work on July 15, 1929, was less than the above specified minimums, in which latter case not to pay less than the hourly rate on July 15, 1929, and in no event less than 30c per hour for males, and 25c per hour for females, and provided further that learners and apprentices may be paid not less than 80% of the above minimum wages for a period of not to exceed three (3) months; but the total number of such learners and apprentices shall not exceed 5% of the total number employed by any such employer in any calendar month.

5. The above minimum wage shall not in any way be considered as a discrimination by reason of sex, and where in any case females do substantially the same work, or perform substantially the same duties as men, they shall receive the same amount of wages as men receive for doing such work or performing such duties.

6. On and after the effective date, the minimum wage that shall be paid by any employer to all other employees except commission sales people, shall be not less than \$15.00 per week in any city of over 500,000 population, or in the immediate trade area of such city; nor less than \$14.50 per week in any city of between 250,000 and 500,000 population, or in the immediate trade area of such city; nor less than \$14.00 per week in any city of between 2,500 and 250,000 population, or in the immediate trade area of such city; and in towns of less than 2,500 population, to increase all wages by not less than 20%, provided that this shall not require wages in excess of \$12.00 per week.

7. On and after the effective date employers shall not operate on a schedule of hours of labor in excess of 40 hours per week per employee; PROVIDED, HOWEVER, that these limitations shall not apply to branches of this industry in which seasonal or peak demand or breakdown places an unusual and temporary burden upon such branches; in such cases such number of hours may be worked as are required by the necessity of the situation,

PROVIDING FURTHER, that in no case shall the hours worked in any one week exceed 48 hours and

PROVIDING FURTHER, that the number of hours of overtime worked, in any six (6) months period, shall not exceed 32 hours; and

PROVIDING FURTHER, that nothing in the foregoing employment provisions shall apply to executive, administrative, supervisory, emergency, repair employees and outside sales and service men.

8. It is understood, however, that old and partially disabled employees and watchmen are not included in the above labor provisions, except that they shall in no case be paid less than 80% of the above minimum, and provided that the total of such employees shall not exceed two (2) per cent of the total number of employees.

9. With a view to keeping the President of the United States informed as to the observance or non-observance of this Code, and as to whether the Industry is taking proper steps to effectuate in all respects the declared policy of the National Industrial Recovery Act, each employer shall furnish duly certified reports at such times and in such form as the President may require.

10. The Fabricated Metal Products Federation or successor associations, the

## Basing Points Omitted

**I**N the chart of basing points for the iron and steel industry as established under the code of fair competition, which appeared in *The Iron Age* last week, two basing points were inadvertently omitted. Users of this chart are requested to add Steelton, Pa., as a basing point for low phosphorus pig iron, and Minnequa, Colo., as a basing point for railroad track spikes. Rail steel reinforcing bars, which are not given individual basing points under Schedule F of the Code, take the same basing points in the chart as concrete reinforcing bars.

applicant herein, is hereby constituted the agency to collect and receive such reports.

It is understood, however, that when any group is represented by a representative trade association, such association may collect such statistics as called for by the President of the United States and send them in compiled form to the Federation as hereinafter defined.

11. All data filed in accordance with the provisions of Article 9 hereto shall be confidential and shall not be revealed to any one other than an authorized governmental agency.

12. To further effectuate the policies of the Act, the Fabricated Metal Products Federation, or its successor association, is set up to cooperate with the Administrator as a planning and fair practice agency for this industry. Such agency may from time to time present to the Administrator recommendations based on conditions in the industry as they may develop and request modifications or additional provisions to this Code of Fair Competition. Such rules, when approved by the President of the United States, shall have the same force and effect as any other provision of this Code.

13. The following acts, as described, shall constitute unfair methods of competition:

A. The paying of lower wages than prescribed herein or the operation of hours of labor in excess of the maximum herein prescribed.

B. The sale or exchange of any product, in whole or in part, below the reasonable total cost of such product, in whole or in part, as produced in the United States and under such conditions as will maintain the social and economic standards of the United States.

C. Withholding from, or inserting in any invoice, words or figures which make or tend to make such invoice a false record, wholly or in part, of the transaction represented on the face thereof, and of the payment or allowance of secret rebates, refunds, credits, unearned discounts, whether in the form of money or otherwise; or the extension to certain purchasers of prices, services or privileges not extended to all purchasers under like conditions.

D. To defame or disparage a competitor directly or indirectly, by words or acts, which untruthfully impugn his business integrity, his ability to keep his contracts, his credit standing, or the quality of his products; or marking, branding, labelling products and making statements regarding products, the purpose or effect of which may be misleading or tend to deceive purchasers as to the quantity, quality, grade or substance of the goods purchased.

E. To imitate or simulate the trade mark, trade name, package, wrapper or label of a competitor's product to such a degree as to deceive or have a tendency to deceive customers.

F. To give, or permit to be given, to agents or employees or representatives of customers, or agents, employees or representatives of competitors or of prospective customers, money, or anything of value, to induce them to influence their employers, or principals, to purchase, or contract to purchase products of this industry, or to influence such employers, or principals to refrain from contracting with competitors.

14. When formal complaint is made to the Federation by any member thereof that the provisions of this Code have been violated by any employer or group of employers, then after every effort has been made to settle such complaint within

the sub-division (if any) falling under this Code, the proper agency of the Federation shall investigate the facts, and to that end may cause such examination or audit to be made as may be deemed necessary and report to the Administrator the results of such examination.

15. This Code is intended to be a Basic Code and to cover the entire industry. It is understood, however, that Trade Associations, or groups of Manufacturers representing a substantial part of any specific industry or trade group may formulate a supplementary Code of Fair Competition, defining specifically its industry and covering such additional regulations as they consider advisable. These regulations, however, shall conform to the principles of the Basic Code. Such codes when approved by the President of the United States shall have the same force and effect as the Basic Code.

16. It is further understood that if at any time any clearly identified group included under the Basic Code, wishes to

function outside the Basic Code it can submit a separate code defining and covering its specific industry. Such a code when approved by the President of the United States shall have the same force and effect as any code.

17. Any employer or any qualified Trade Association may participate in this Code and any revisions or additions thereto and receive the benefits thereto by accepting the proper pro rata share of the cost and responsibility of creating and administering it, either by becoming a member of the Fabricated Metal Products Federation or by paying to it an amount equal to the dues from time to time provided to be paid by a member in like situation of the Fabricated Metal Products Federation.

18. The President of the United States may from time to time cancel or modify any order, license, rule or regulation, as provided for under Title I, Section 10 d, of the National Industrial Recovery Act.

## OBITUARY



WILLIAM BURG

WILLIAM BURG, who had been engaged in the iron and steel trade in the St. Louis district for 67 years until his retirement last March 1, died in a hospital there on Aug. 30 of infirmities of old age after a short illness. Mr. Burg was 86 years old.

Born in a log cabin at Main and Walnut Streets, St. Louis, on March 1, 1847, Mr. Burg spent his entire life in that city, and received his formal education in its private and public schools. He began his business career in the "iron shop" of James Archer, whose stock consisted of iron nails, anvils, hoops and tires, such as blacksmiths and wagon makers required.

After four years with Mr. Archer, Mr. Burg joined the firm of William H. Markham & Co., dealers in iron and steel, traveling for them during 1870 and 1875.

When the Ewald Iron Co. was organized, Mr. Burg was first secretary, and was connected with this firm as stockholder, secretary and general

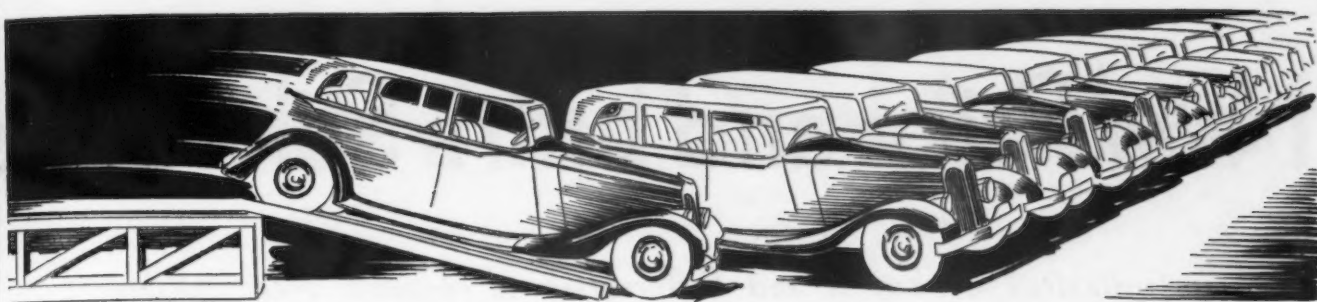
manager until 1896, when he sold his interest to L. P. Ewald. The Ewald company, during Mr. Burg's connection with it, purchased the Tennessee Rolling Works.

Since 1896, Mr. Burg had been in business for himself as an iron broker at 119 North Third Street, Merchants' Exchange Building, St. Louis, where he went daily until he retired.

Mr. Burg declared that he bought some of the first billets that Andrew Carnegie made. "Carnegie was just then getting started, and I distinctly recollect that we discussed his product liberally in our plant," he continued. "Many years later I had the pleasure of meeting Mr. Carnegie. I told him that I was one of his first customers. He made a typical Carnegie remark: 'Well, it was a good product, wasn't it?' I told him it was."

JOSEPH MATHES, chairman of the Board of the Lewin-Mathes Co., metals, St. Louis, died suddenly of heart disease on July 27 at his home there. He was 60 years old. Born in New York, he came to St. Louis in his early youth and attended the public schools there. He entered the firm of G. Mathes Sons, dealers in old materials, which later became G. Mathes Co., of which he was president, when it was taken over in 1931 by the Lewin Metals Co. The Lewin-Mathes Co. was then formed as a holding company for the properties with Mr. Mathes as chairman.

HARRY E. DENNIE, president, Security Rubber & Belting Co., Chicago, died Aug. 31, after an illness of several months. Mr. Dennie was born at Grand Rapids, Mich., 58 years ago. He spent all of his business life in the rubber industry and 10 years ago founded his own company at Chicago.



▲ ▲ ▲ THIS WEEK ON THE ASSEMBLY LINE ▲ ▲ ▲

## Chrysler Places Large Steel Order

DETROIT, Sept. 6.

**A**LTHOUGH assemblies tapered somewhat the past week, automobile production in September, which is usually one of the poorer months of the year, will not fall far below the output in the peak month of 1932. The August total is estimated at 220,000 units and this month Chevrolet, Chrysler and Ford together will make at least 160,000 units. This means that the entire industry will assemble 185,000 to 190,000 cars. Detroit's employment today is at the highest point of the year, the index of the Board of Commerce standing at 64.7, an upward swing of two points in the last 30 days and more than double the figure a year ago. Retail car sales are beginning to lose ground but continue to show amazing strength. Chevrolet, for instance, is reported to have made as many retail deliveries in August as in July. Chevrolet's production last month, according to the latest figures, was over 73,000 units.

Chrysler's steel releases last week are roughly estimated at 100,000 tons, all of it to be shipped by mills not later than October 15. The purchase covers all the steel for life of current models and steel for some parts which will not be changed on new models. Chrysler will make 55,000 to 60,000 cars in September. This is one of the largest steel releases in the history of the company.

Many Chrysler manufacturing divisions are operating three shifts a day. The demand for the Dodge car has been so great that the cylinder block machining facilities at the Dodge plant have been inadequate and some of this work is now being done at the Plymouth division.

Aside from Chrysler, steel releases from the automobile industry have fallen off considerably, but some moderate tonnages are expected late this month. An important builder in the medium-price field is now placing orders for its first production run on its 1934 models on which it will begin

operations about Oct. 1. Further clean-up orders are expected from the Chevrolet Motor Co., which is reported to be planning the assembly of 90,000 to 100,000 more units of its present line. These figures, of course, are subject to revision according to the sales trend.

Ford has not bought steel except to meet its requirements through September and the early part of October. Despite the knowledge that it must pay more for steel under the code, it refused to be stampeded into ordering material ahead. According to the new prices and the applications of extras, it is believed that for some grades of steel Ford will have to pay \$10 to \$15 a ton more. The steel trade is watching with unusual interest the reaction of the Ford company to the new steel set-up. Mr. Ford has had his own way so long that the steel set-up is thought to be as distasteful to him as acceptance of the NRA automobile code. Ford is understood to have tentative plans for a total of 105,000 units in September and October.

**S**TEEL buyers in the automotive field have been so accustomed to shopping around for price concessions that they sustained quite a shock the past week when they tried the same old method and found it didn't work. While some business is being booked by mills at the new quotations, the tonnage in the aggregate is light. The first major purchases by automobile makers at present prices are not expected until near the end of September or in October.

The most radical change yet revealed for 1934 models is coil springs which it is reported will be used on all General Motors cars. Their adoption makes possible independently sprung front wheels. It is believed that the front axle will be eliminated from the Pontiac, Olds, La Salle and Cadillac, but will be retained on the Chevrolet. That is, the design of the front end of the Chevrolet will differ slightly from that of other General Motors cars to save somewhat on

production costs; nevertheless independent suspension of front wheels will be achieved.

Pontiac is contemplating only slight changes for 1934. The same is true of the Chrysler lines. Hudson has ahead of it an extensive retooling program said to be occasioned by change in body design. Packard this week is announcing its 1934 car, which does not differ materially from this year's car. Nash will be the next manufacturer to reveal 1934 models, showing them shortly for the first time in its plate glass tower at the Century of Progress Exposition.

### Lower Production Costs Essential

The automobile code should be of help to the machine tool industry. Faced with higher materials and labor costs, plus shorter working hours, manufacturers are deeply concerned about preventing production costs from ascending too sharply. The easiest and most satisfactory way to do this is to cut the number of operations necessary for processing each part and to increase the use of automatic machinery. One company already is ascertaining what machining operations can be combined or eliminated with a view to cost reduction. The factory with antiquated machinery will bear the full brunt of higher costs; the plant which modernizes its equipment will stand the best chance of holding its competitive position. This matter assumes further importance when one remembers that the company which raises its retail prices least in 1934 will have a strategic advantage over its rivals, consequently costs must be held down to the minimum. Chevrolet is in the midst of its retooling program. So is Buick. Oldsmobile will spend about \$250,000 on rebuilding present equipment and buying jigs, fixtures, small tools and a few new machine tools. Cadillac is said to be preparing a similar program. Chrysler has been the most consistent buyer of machine tools all year and still will be a considerable factor in the coming weeks.

# New Price and Extra Schedule S

## *Standardization of Extras and Differentials Is Notable Accomplishment Which Will Benefit Consumers and Producers*



**A**LTHOUGH the iron and steel industry's code of fair competition became officially effective with its signing by the President on Aug. 19, business actually began to be guided by its provisions following a general meeting of the American Iron and Steel Institute in New York on Sept. 1. In the meantime 160 producers of iron and steel products had filed schedules of prices with the institute and directors of that organization had held an organization meeting in order to make the terms of the code effective.

The general meeting of the institute had been called in order that certain provisions of the code might be clarified and that all questions relating to its proper functioning might be answered. Following interpretative remarks by W. A. Irvin, president of the United States Steel Corp., and chairman of the general administrative committee of the institute, and by President Eugene G. Grace of the Bethlehem Steel Corp., the more than 200 members in attendance pledged adherence to the code. It was also announced that a number of smaller producers who had not originally signed the code had since done so, and that code membership now embraced more than 97 per cent of the industry's productive capacity.

The general administrative committee, which will have full charge of the administration of the code at times when the institute's directors are not in session, consists, in addition to Messrs. Irvin and Grace, of T. M. Girdler, chairman and president, Republic Steel Corp.; E. T. Weir, chairman, National Steel Corp.; L. E. Block, chairman, Inland Steel Co., Hugh Morrow, president, Sloss-Sheffield Steel & Iron Co., and W. J. Filbert, vice-chairman, United States Steel Corp. The full membership of the commercial committee, headed by S. E. Hackett, vice-president, Jones & Laughlin Steel Corp.; the labor committee, under Frank Purnell, president, Youngstown Sheet & Tube Co., and the statistical committee, headed by Mr. Filbert, will soon be announced.

With the filing of price schedules under the code, members of the industry have been engaged in the tabulation of extras, differentials and trade practice agreements. Base prices are little changed and the fundamental principles underlying the application of

extras and differentials have been preserved. Of great importance to the industry, however, is the establishment of a single set of extras which shall be applicable to the same products as sold by all producers. While it has naturally taken considerable time to reconcile minor differences, the general principles are now effective and are already governing the sales efforts of the members of the code. The schedules are not yet drafted in their final form, but the work of the various sub-committees on individual products is largely complete and awaits only the final approval of the institute's directors before official release. This approval will probably be forthcoming at a directors' meeting on Sept. 8. At that time, full details of extras, differentials, basing points and prices will be published in *THE IRON AGE*, but in the meantime tentative schedules published herewith are in general use and will likely receive little alteration.

On tubular goods, discounts and extras contained in the most recent published cards of the leading producers have generally been reaffirmed. This is also true of cold-finished steel bars and shafting. On wire products certain final revisions remain to be approved.

### **Delivered Prices Must Be Quoted**

Delivered prices must be quoted by adding to the base price the all-rail published tariff freight rate from the nearest basing point to destination in terms of all-rail freight rates. (Exceptions: Rails, 60-lb. and heavier, and angle bars take an f.o.b. mill base, and track spikes and tie plates sold to railroad companies are quoted f.o.b. nearest basing point.)

When shipments are made to basing points, the delivered prices are computed by adding to the basing point prices the switching rate to destination.

If shipment is made by truck, a reduction in the all-rail delivered price may be made equivalent to 65 per cent of the carload all-rail published tariff freight charge from place of shipment to place of delivery. Trucking charges are to be paid by the buyer.

### **Terms of Payment**

The date of shipment will in all cases be the date of the invoice. Post-dating of invoices is not permitted by the code. Terms of payment are as set forth in Schedule G of the code.

### **Chemical Analysis of Steel**

Basic open-hearth, acid open-hearth and acid Bessemer steel will be made within standard ranges of chemical composition as shown in the tables. When specifications call for closer ranges extra charges will be imposed unless a combination of orders is so arranged that all steel coming within the standard ranges can be applied.

\*These prices are published in advance of their formal approval by the American Iron and Steel Institute, but in all probability will prove to be correct.

# Standard Ranges in Chemical Composition Submitted by Steel Makers \*

## Standard Ranges in Chemical Composition Based on Ladle Analysis

### BASIC OPEN-HEARTH STEEL

CARBON	Standard Range Per Cent
Lowest maximum to be specified	
0.10 per cent	
When minimum of range ordered is:	
Up to 0.20 per cent inclusive.....	0.05
From 0.21 to 0.50 per cent inclusive.....	0.10
From 0.51 to 0.95 per cent inclusive.....	0.15
From 0.96 to 1.40 per cent inclusive.....	0.20

### MANGANESE

Lowest maximum to be specified	
0.40 per cent	
When minimum of range ordered is:	
Up to 0.35 per cent inclusive.....	0.15
From 0.36 to 0.60 per cent inclusive.....	0.20
From 0.61 to 1.20 per cent inclusive.....	0.30
From 1.21 to 1.60 per cent inclusive.....	0.35

### PHOSPHORUS

Lowest maximum to be specified	
0.04 per cent	
When minimum of range ordered is:	
Up to 0.04 per cent inclusive.....	0.02
From 0.041 to 0.05 per cent inclusive.....	0.025
From 0.051 to 0.075 per cent inclusive.....	0.03

### SULPHUR

Lowest maximum to be specified	
0.05 per cent	
When minimum of range ordered is:	
Up to 0.075 per cent inclusive.....	0.07
From 0.076 to 0.10 per cent inclusive.....	0.08

### SILICON

When minimum of range ordered is:	
Up to 0.14 per cent inclusive.....	0.10
From 0.15 to 0.24 per cent inclusive.....	0.15
From 0.25 to 0.40 per cent inclusive.....	0.20
From 0.41 to 1.80 per cent inclusive.....	0.40

### COPPER

Minimum only to be specified.

## Standard Ranges in Chemical Composition Based on Ladle Analysis

### ACID OPEN-HEARTH STEEL

CARBON	Standard Range Per Cent
Lowest maximum to be specified	
0.10 per cent	
When minimum of range ordered is:	
Up to 0.20 per cent inclusive.....	0.05
From 0.21 to 0.50 per cent inclusive.....	0.10
From 0.51 to 0.95 per cent inclusive.....	0.15
From 0.96 to 1.40 per cent inclusive.....	0.20

### MANGANESE

Lowest maximum to be specified	
0.45 per cent	
When minimum of range ordered is:	
Up to 0.35 per cent inclusive.....	0.15
From 0.36 to 0.60 per cent inclusive.....	0.20
From 0.61 to 1.20 per cent inclusive.....	0.30
From 1.21 to 1.60 per cent inclusive.....	0.35

### PHOSPHORUS

Lowest maximum to be specified	
0.05 per cent	

### SULPHUR

Lowest maximum to be specified	
0.05 per cent	

### SILICON

When minimum of range ordered is:	
Up to 0.14 per cent inclusive.....	0.10
From 0.15 to 0.24 per cent inclusive.....	0.15
From 0.25 to 0.40 per cent inclusive.....	0.20
From 0.41 to 1.80 per cent inclusive.....	0.40

### COPPER

Minimum only to be specified

## Standard Ranges in Chemical Composition Based on Ladle Analysis

### ACID BESSEMER STEEL

CARBON	Standard Range Per Cent
Lowest maximum to be specified	
0.08 per cent	
When minimum of range ordered is:	
Up to 0.10 per cent inclusive.....	0.05
From 0.11 to 0.40 per cent inclusive.....	0.10
From 0.41 to 0.60 per cent inclusive.....	0.15
From 0.61 to 0.75 per cent inclusive.....	0.20

### MANGANESE

Lowest maximum to be specified	
0.40 per cent	
When minimum of range ordered is:	
Up to 0.35 per cent inclusive.....	0.15
From 0.36 to 0.60 per cent inclusive.....	0.20
From 0.61 to 1.20 per cent inclusive.....	0.30
From 1.21 to 1.60 per cent inclusive.....	0.35

### PHOSPHORUS

Lowest maximum to be specified	
0.11 per cent	

### SULPHUR

Lowest maximum to be specified	
0.06 per cent	
When minimum of range ordered is:	
Up to 0.075 per cent inclusive.....	0.07
From 0.076 to 0.10 per cent inclusive.....	0.08
From 0.101 to 0.20 per cent inclusive.....	0.10

### SILICON

When minimum of range ordered is:	
Up to 0.14 per cent inclusive.....	0.10
From 0.15 to 0.24 per cent inclusive.....	0.15
From 0.25 to 0.40 per cent inclusive.....	0.20

### COPPER

Minimum only to be specified

## Revised Size Extras on Semi-Finished Steel

### BILLETS, BLOOMS AND SLABS (REROLLING QUALITY)

Billets, blooms and slabs, rerolling quality, are quoted at \$26 a gross ton f.o.b. the following basing points: Pittsburgh, Buffalo, Cleveland, Chicago, Gary, Ind., Birmingham and Youngstown.

### BILLETS, BLOOMS AND SLABS (FORGING QUALITY)

Billets, blooms and slabs, forging quality, are quoted at \$31

a gross ton f.o.b. the following basing points: Pittsburgh, Buffalo, Cleveland, Chicago, Gary, Birmingham and Youngstown. Sizes smaller than 4 x 4 in. are to be sold on a bar basis only, subject to bar card extras.

### SHEET BARS

Sheet bars are quoted at \$26 a gross ton f.o.b. the following basing points: Pittsburgh, Buffalo, Cleveland, Chicago, Youngs-

town and Canton. No size extras apply. Standard extras for chemistry are shown in the table of semi-finished steel extras.

#### SKELP

Skelp groove-rolled, universal or sheared, is quoted at 1.60c. a lb. (net, no extras) f.o.b. the following basing points: Pittsburgh, Buffalo, Chicago, Youngstown, Coatesville, Pa., and Sparrows Point, Md.

#### WIRE RODS (IN COILS)

Wire rods are quoted at \$35 a gross ton, base Pittsburgh or Cleveland; \$36 base Chicago; \$38, base Birmingham; and \$36 a gross ton delivered f.o.b. cars Youngstown. Subject to standard wire rod extras.

#### Classification of Extras on Semi-Finished Steel

Blooms, Billets, Slabs and Sheet Bars  
(Bessemer and Open-Hearth Steel)

Extras per Gross Ton to be Added to the Base Price

##### EXTRAS FOR SIZE

##### BLOOMS, BILLETS AND SLABS

To be added to base price for rerolling and forging quality billets:

Squares under 4 x 4 in. to 1½ x 1½ in., inclusive or rectangular sections of equivalent area.....	\$1.00
4 x 4 in. to 9 x 9 in., inclusive, or equivalent area..	No extra
Over 9 x 9 in. to under 14 x 14 in. or equivalent area..	\$2.00
14 x 14 in. to under 16 x 16 in. or equivalent area..	4.00
16 x 16 in. to under 20 x 20 in. or equivalent area..	6.00
20 x 20 in. and over or equivalent area.....	8.00
Weight per piece when ordered 12,000 lb. or over..	10.00
(This shall not apply when product of ingot is accepted)	

##### EXTRAS FOR QUALITY

Special requirement quality or carburizing quality..	\$5.00
(To be added to base price for forging quality billets)	

##### EXTRAS FOR CHEMICAL SPECIFICATIONS

BLOOMS, BILLETS, SLABS AND SHEET BARS  
(BESSEMER AND OPEN-HEARTH STEEL)

##### CARBON

(The mean of the range agreed upon between purchaser and manufacturer shall determine the extra)

Open-Hearth 0.10/0.25 per cent.....	No extra
Bessemer 0.08/0.25 per cent.....	
0.26/0.60 per cent.....	\$1.00
0.61/1.25 per cent.....	3.00

When maximum specified is:

Open-Hearth 0.09.....	
0.07.....	\$1.00

##### MANGANESE

(The mean of the range agreed upon between purchaser and manufacturer shall determine the extra)

0.30/0.90 per cent.....	No extra
0.91/1.15 per cent.....	\$2.00
1.16/1.35 per cent.....	4.00
1.36/1.50 per cent.....	5.00
1.51/2.00 per cent.....	13.00

NOTE: For manganese content above a mean of 1.15 per cent the above extras apply only to steel with maximum carbon specified 0.20 per cent or higher. Prices for exceptions made by this note will be quoted on application.

##### SILICON

(The mean of the range agreed upon between purchaser and manufacturer shall determine the extra)

Minimum not specified.....	No extra
Up to 0.25 per cent inclusive.....	\$2.00
0.26 to 0.50 per cent inclusive.....	4.00

##### PHOSPHORUS

Minimum not specified.....	No extra
0.04 per cent minimum to 0.08 per cent minimum.....	\$1.00
NOTE: Phosphorus extra applies to open-hearth steel only.	
Phosphorus extra does not apply to sheet bars.	

##### SULPHUR

Minimum not specified.....	No extra
0.07 per cent minimum to 0.10 per cent minimum.....	\$2.00
0.11 per cent minimum to 0.20 per cent minimum.....	3.00
0.21 per cent minimum to 0.30 per cent minimum.....	5.00

##### COPPER

Copper content 0.20/0.30 per cent.....	\$1.00
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## Rails and Truck Supplies

Steel rails, 60-lb. and heavier, along with angle bars and rail joints, take an f.o.b., mill base, being the only finished steel products to be so sold. Heavy rails are unchanged in price at \$40 a ton. On lots of 25 to 499 tons, an extra of \$2 a ton is applied, while an order for less than 25 tons is assessed \$4 a ton extra. Other extras on rails are essentially unchanged.

#### TIE PLATES

Tie plates are quoted at \$38 a net ton, f.o.b. following basing points: Pittsburgh, Chicago, Birmingham, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Buffalo, and Steelton, Pa. They are quoted \$40 per net ton f.o.b. cars on dock at Pacific Coast ports. Subject to extras per standard classification of extras on rolled steel tie plates.

#### STANDARD EXTRAS ON TIE PLATES

	Extra Per Net Ton
Soft, medium and hard grades, ordered to standard specifications for steel tie plates, adopted by the Association of American Steel Manufacturers on Feb. 21, 1923 .....	No Extra
When specified:	
Carbon 0.30/0.60 per cent .....	\$1.00
Carbon 0.61 per cent or over .....	3.00
Copper up to 0.20 per cent minimum .....	2.00
Silicon 0.15/0.30 per cent .....	2.00
Special designs, workmanship, chemical or physical requirements .....	Extra upon Application

#### QUANTITY:

20 net tons and over .....	No Extra
Under 20 net tons to 10 net tons .....	\$3.00
Under 10 net tons to 5 net tons .....	6.00
Under 5 net tons to 2 net tons .....	15.00
Under 2 net tons to 1 net ton .....	40.00

#### RAILROAD TRACK SPIKES

Railroad track spikes are quoted at 2.40c. a lb. base f.o.b. the following basing points: Pittsburgh, Chicago, Birmingham, Youngstown, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Philadelphia, Lebanon, Pa., Columbia, Pa., Richmond, Va., Jersey City, N. J. Subject to extras per standard classification of extras on spikes.

#### Standard Extras on Track Spikes

SIZE (All lengths measured under the throat)	Per 100 lb.
9/16 x 4½ and larger, up to and including	
¾ x 6½ in.....	No Extra
½ x 5 in. ....	\$0.25
4½ in. ....	0.25
4 in. ....	0.25
3½ in. ....	0.50
3 in. ....	0.50
7/16 x 4½ in. ....	0.65
4 in. ....	0.65
3½ in. ....	0.65
3 in. ....	0.75
¾ x 4½ in. ....	0.90
4 in. ....	0.90
3½ in. ....	0.90
3 in. ....	0.90
2½ in. ....	1.15
2 in. ....	1.25
5/16 x 3½ in. ....	1.70
3 in. ....	1.70
2½ in. ....	1.70
2 in. ....	1.70
High carbon open-hearth (Min. 0.30 per cent carbon)	0.05
Copper-bearing, up to 0.20 minimum.....	0.10
Goldie points .....	0.15
Special designs, minimum.....	0.15
Shimming spikes .....	0.15
Reverse points .....	0.25
100-lb. kegs .....	0.10

#### QUANTITY

200 kegs and over.....	No Extra
100 kegs to 199 kegs, inclusive.....	0.10
25 kegs to 99 kegs, inclusive.....	0.25
24 kegs and under.....	0.50

# Chicago Base Lower on Heavy Hot-Rolled Steel

## Merchant Bars and Small Shapes

Merchant bars and small shapes are quoted at 1.60c., Pittsburgh; 1.65c., Gary, Chicago or Cleveland; 1.70c., Buffalo; 1.75c., Birmingham; 2.00c., f.o.b. cars on dock, Gulf ports, and 2.15c., f.o.b. cars on dock, Pacific Coast ports. The same prices apply on tube rounds at Pittsburgh, Buffalo, Chicago, Cleveland and Birmingham. Small shapes are identified as angles, channels and tees with greatest thickness less than  $\frac{1}{4}$  in. and greatest dimension less than 3 in. The base prices are subject to all extras, according to standard classification of extras covering those products.

Size extras, to be added to the base price per lb. have been subject only to minor changes. As heretofore, the next higher extra applies to intermediate sizes. These extras are as follows:

### ROUNDS AND SQUARES

	Base
$\frac{3}{4}$ to $3\frac{1}{8}$ in.	0.10c.
$\frac{5}{8}$ to $1\frac{1}{8}$ in.	0.15c.
$\frac{1}{2}$ in.	0.20c.
$\frac{3}{8}$ in.	0.30c.
$\frac{1}{4}$ in.	0.40c.
$1\frac{1}{32}$ in.	0.55c.
$\frac{7}{8}$ in.	0.70c.
$\frac{9}{32}$ in.	0.85c.
$\frac{1}{4}$ in.	1.00c.
$1\frac{1}{64}$ in.	1.25c.
$\frac{3}{32}$ in.	1.50c.
$\frac{1}{8}$ in.	2.00c.
$3\frac{1}{8}$ to $3\frac{3}{8}$ in.	0.10c.
$3\frac{1}{2}$ to $4\frac{1}{8}$ in.	0.15c.
$4\frac{1}{8}$ to $4\frac{3}{8}$ in.	0.25c.
$4\frac{3}{8}$ to $5\frac{1}{8}$ in.	0.35c.
$5\frac{1}{8}$ to $5\frac{3}{8}$ in.	0.45c.
$5\frac{3}{8}$ to $6\frac{1}{8}$ in.	0.55c.
$6\frac{1}{8}$ to $6\frac{3}{8}$ in.	0.65c.
$6\frac{3}{8}$ to $7\frac{1}{8}$ in.	0.75c.
$7\frac{1}{8}$ to $7\frac{3}{8}$ in.	0.85c.
$7\frac{3}{8}$ to 8 in.	1.10c.

### FLATS

#### Thickness in Inches

Width in Inches	4 to $3\frac{1}{8}$	3 to $2\frac{1}{8}$	2 to $1\frac{1}{8}$	1 to $\frac{1}{8}$	$\frac{3}{4}$ to $\frac{1}{2}$	$\frac{7}{8}$ to $\frac{3}{4}$	$\frac{1}{4}$ to $\frac{1}{8}$
$\frac{3}{8}$	.....	.....	.....	.....	.....	1.40	1.40
$\frac{1}{2}$	.....	.....	.....	.....	.....	1.00	1.20
$\frac{5}{8}$	.....	.....	.....	.....	.....	0.70	0.90
$\frac{3}{4}$	.....	.....	.....	.....	.....	0.50	0.75
$\frac{7}{8}$	.....	.....	.....	.....	.....	0.40	0.60
$1\frac{1}{8}$	.....	.....	.....	.....	.....	0.30	0.40
$1\frac{1}{4}$	.....	.....	.....	.....	.....	0.20	0.30
$1\frac{1}{2}$	.....	.....	0.10	Base	Base	Base	0.15
$1\frac{3}{4}$	.....	.....	0.10	Base	Base	Base	0.15
$2\frac{1}{8}$	.....	0.20	0.10	Base	Base	Base	0.15
$2\frac{1}{4}$	.....	0.20	0.10	Base	Base	Base	0.15
$2\frac{3}{8}$	0.30	0.20	0.10	Base	Base	Base	0.15
$3\frac{1}{8}$	0.30	0.20	0.10	Base	Base	Base	0.15
$3\frac{3}{8}$	0.30	0.20	0.10	Base	Base	Base	0.15
$4\frac{1}{8}$	0.30	0.20	0.10	Base	Base	Base	0.15
$5\frac{1}{8}$	0.30	0.20	0.10	Base	Base	Base	0.15

### EQUAL LEG ANGLES

$4 \times 4 \times \frac{1}{8}$ in.	0.30c.
$3\frac{1}{2} \times 3\frac{1}{2} \times \frac{1}{8}$ in.	0.30c.
$3 \times 3 \times \frac{1}{8}$ in.	0.35c.
$3 \times 3 \times \frac{1}{4}$ in.	0.50c.
$1\frac{1}{2} \times 1\frac{1}{2}$ and wider, but under 3 in. wide $\times \frac{1}{8}$ in. and heavier.	0.15c.
$1\frac{1}{2} \times 1\frac{1}{2}$ in. and wider, but under 3 in. wide $\times \frac{1}{4}$ in.	0.25c.
$1 \times 1$ to $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$ in. and heavier.	0.25c.
$1 \times 1$ to $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{4}$ in.	0.30c.
$\frac{7}{8} \times \frac{7}{8} \times \frac{1}{8}$ in.	0.35c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$ in.	0.40c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{4}$ in.	0.45c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2}$ in.	0.60c.
$\frac{5}{8} \times \frac{5}{8} \times \frac{1}{8}$ in.	1.50c.
$\frac{5}{8} \times \frac{5}{8} \times \frac{1}{4}$ in.	2.00c.
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{8}$ in.	2.20c.
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{4}$ in.	2.50c.

### UNEQUAL LEG ANGLES

$4 \times 3 \times \frac{1}{8}$ in.	0.30c.
$3\frac{1}{2} \times 3 \times \frac{1}{8}$ in.	0.30c.
$3\frac{1}{2} \times 2\frac{1}{2} \times \frac{1}{8}$ in.	0.30c.
$3\frac{1}{2} \times 2 \times \frac{1}{8}$ in.	0.35c.
$3 \times 2\frac{1}{2} \times \frac{1}{8}$ in.	0.35c.
$3 \times 2 \times \frac{1}{8}$ in.	0.35c.
$2\frac{1}{2} \times 2 \times \frac{1}{8}$ in.	0.15c.
$2\frac{1}{2} \times 2 \times \frac{1}{4}$ in.	0.25c.
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$ in. to $\frac{1}{8}$ in. incl.	0.20c.
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$ to $\frac{1}{8}$ in. incl.	0.20c.
$2\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{2}$ to $\frac{1}{8}$ in. incl.	0.20c.
$2 \times 1\frac{1}{2} \times \frac{1}{8}$ to $\frac{1}{8}$ in. incl.	0.15c.
$2 \times 1\frac{1}{2} \times \frac{1}{4}$ in.	0.25c.
$2 \times 1\frac{1}{2} \times \frac{1}{2}$ to $\frac{1}{8}$ in. incl.	0.20c.
$2 \times 1 \times \frac{1}{8}$ in.	0.30c.
$2 \times 1 \times \frac{1}{4}$ in.	0.40c.
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$ to $\frac{1}{8}$ in. incl.	0.25c.
$2 \times 1\frac{1}{2} \times \frac{1}{4}$ to $\frac{1}{8}$ in. incl.	0.15c.
$1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{8}$ in.	0.35c.
$1\frac{1}{2} \times \frac{3}{4} \times \frac{1}{4}$ in.	0.40c.
$1 \times \frac{3}{4} \times \frac{1}{8}$ in.	0.50c.
$1 \times \frac{3}{4} \times \frac{1}{4}$ in.	0.60c.

Other unequal leg angles take extras of equal leg angles of the short dimensions.

### CHANNELS

$1\frac{1}{2}$ in. and wider, but under 3 in. wide $\times \frac{1}{8}$ in. and heavier	0.25c.
$1\frac{1}{2}$ in. and wider, but under 3 in. wide $\times \frac{1}{4}$ in.	0.40c.
$1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{8}$ in. (special box channel)	0.40c.
$1$ to $1\frac{1}{4} \times \frac{1}{8}$ in. and heavier.	0.40c.
$1$ to $1\frac{1}{4} \times \frac{1}{4}$ in.	0.50c.
$1$ to $1\frac{1}{4} \times \frac{3}{4}$ in.	0.70c.
$\frac{3}{4}$ and $\frac{7}{8} \times \frac{1}{8}$ in. and over.	0.50c.
$\frac{3}{4}$ and $\frac{7}{8} \times \frac{1}{4}$ in.	0.60c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{3}{4}$ in.	0.80c.
$\frac{3}{4} \times 1\frac{1}{32} \times \frac{3}{32}$ in.	1.00c.
$\frac{3}{4} \times 15$ gage and $\frac{5}{64}$ in.	1.00c.
$\frac{5}{8} \times \frac{1}{8}$ in. and over.	1.70c.
$\frac{5}{8} \times \frac{1}{4} \times \frac{1}{8}$ in.	1.70c.
$\frac{5}{8} \times \frac{3}{32}$ in.	2.00c.
$\frac{1}{2} \times \frac{3}{4}$ in. and over.	2.50c.
$\frac{1}{2} \times \frac{5}{8}$ in.	3.00c.

### TEES

$1\frac{1}{2} \times 1\frac{1}{2}$ in. and wider, but under $3 \times \frac{1}{8}$ in. and over	0.30c.
$1 \times 1$ to $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{8}$ in. and over.	0.55c.
$1 \times 1$ to $1\frac{1}{4} \times 1\frac{1}{4} \times \frac{1}{4}$ in.	0.70c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{8}$ in.	0.70c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{4}$ in.	0.90c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{2}$ in.	0.90c.
$\frac{3}{4} \times \frac{3}{4} \times \frac{1}{4}$ in.	1.10c.
$\frac{5}{8} \times \frac{5}{8} \times \frac{1}{8}$ in.	1.80c.
$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{8}$ in.	2.50c.

Unequal tees are subject to special prices.

### HEXAGONS

$1\frac{1}{2}$ to $5\frac{1}{8}$ in.	0.25c.
$\frac{3}{4}$ to $1\frac{1}{8}$ in.	0.125c.
$\frac{5}{8}$ to $\frac{1}{2}$ in.	0.20c.
$\frac{1}{2}$ to $\frac{3}{8}$ in.	0.35c.
$\frac{3}{8}$ in.	0.60c.
$\frac{1}{4}$ in.	0.90c.
$\frac{1}{8}$ in.	1.20c.
$\frac{1}{16}$ in.	1.50c.

### OVALS

$\frac{3}{4}$ to $2\frac{1}{2} \times \frac{3}{4}$ in. and over.	0.30c.
$\frac{3}{4}$ to $2\frac{1}{2} \times \frac{1}{4}$ to $\frac{1}{8}$ in.	0.40c.
$\frac{3}{4}$ to $2\frac{1}{2} \times \frac{3}{32}$ to $\frac{1}{8}$ in.	0.70c.
$\frac{5}{8}$ to $\frac{1}{2} \times \frac{1}{8}$ in. and over.	0.50c.
$\frac{5}{8}$ to $\frac{1}{2} \times \frac{1}{4}$ in.	0.70c.
$\frac{5}{8}$ to $\frac{1}{2} \times \frac{1}{8}$ to $\frac{3}{32}$ in.	1.00c.
$\frac{1}{2}$ to $\frac{3}{8} \times \frac{1}{4}$ in. and over.	1.00c.
$\frac{1}{2}$ to $\frac{3}{8} \times \frac{1}{8}$ to $\frac{1}{8}$ in.	1.30c.
$\frac{1}{2}$ to $\frac{3}{8} \times \frac{3}{32}$ in.	1.60c.
$\frac{3}{8}$ to $\frac{1}{4} \times \frac{1}{8}$ in. and over.	1.60c.
$\frac{3}{8}$ to $\frac{1}{4} \times \frac{1}{4}$ to $\frac{3}{32}$ in.	2.00c.
$\frac{3}{8}$ to $\frac{1}{4} \times \frac{3}{32}$ in.	2.40c.

## HALF OVALS

1 to 4 x ¼ in. and over.....	0.40c.
1 to 4 x Nos. 7, 8, 9 and ⅜ in.....	0.50c.
1 to 4 x Nos. 10, 11, 12 and ½ in.....	0.70c.
¾ to 1½ x ⅜ in. and over.....	0.70c.
¾ to 1½ x Nos. 10, 11, 12 and ½ in.....	0.90c.
¾ to 1½ x Nos. 13, 14 and 15.....	1.20c.
¾ to 1½ x ⅝ in. and over.....	0.90c.
¾ to 1½ x Nos. 10, 11, 12 and ½ in.....	1.20c.
¾ to 1½ x Nos. 13, 14 and 15.....	1.40c.
½ to ¾ x ½ in. and over.....	1.20c.
½ to ¾ x Nos. 13, 14 and 15.....	1.60c.
½ to ¾ x ⅝ in. and over.....	2.00c.
½ to ¾ x Nos. 14 and 15.....	2.40c.

## HALF ROUNDS—SOLID

1 to 3 in.....	0.30c.
¾ to 1½ in.....	0.50c.
¾ to 1½ in.....	0.70c.
½ to ¾ in.....	1.00c.
¾ to 1 in.....	1.50c.
⅝ in.....	1.75c.

Hollow half rounds are subject to special prices.

## AUTOMOBILE SPRING STEEL

### Flats

1¼ to 6 x No. 4 to ½ in. incl.....	Base
1 and 1½ x No. 4 and heavier.....	0.10c.
1 to 3 x No. 5.....	0.15c.
1 to 3 x No. 6.....	0.20c.
1 to 3 x No. 7.....	0.25c.
¾ and 1½ x No. 1 to No. 7.....	0.25c.
¾ to 1½ x No. 1 to No. 7.....	0.50c.
¾ to 3 x No. 8 to No. 10.....	0.50c.
¾ to 3 x No. 11 to No. 16.....	0.75c.
¾ to 3 x No. 17 to No. 20.....	1.10c.
¾ to ¾ x No. 10 to No. 16.....	2.00c.
¾ to ¾ x No. 17 to No. 20.....	2.50c.
¾ to ¾ x No. 21 to No. 24.....	3.00c.

### Rounds and Squares

¾ to 2 in. incl.....	Base
½ to ¾ in. incl.....	0.10c.
¾ to 1 in. incl.....	0.25c.
⅝ in.....	0.50c.
¾ to ¾ in.....	0.75c.

## AUTOMOBILE BUMPER STEEL BARS

Front or impact bars (including special sections) 0.15c. per pound extra for section and quality, plus extras for chemical specification. Other bumper bars subject to automobile spring steel extras, plus extras for chemical specification.

Railroad spring steel bars take the regular bar extras, including extras for chemical specifications, size, cutting and quantity.

On silicon manganese spring steel, an extra of 0.65c. for quality and chemical specifications applies on flats, while rounds and squares take 0.90c. Automobile spring steel size extras apply, plus bar extras for cutting and quantity. For any quality requirements other than chemistry and Brinell hardness limits, an extra of 0.50c. a lb. applies.

Tube rounds take 0.25c. a lb. extra for quality, plus bar card extras for chemical specifications and the following size extras:

Under 4½ in.....	Base
4½ to 4¾ in.....	0.125c.
4¾ to 5¼ in.....	0.175c.
5¼ to 5¾ in.....	0.225c.
5¾ to 6¼ in.....	0.275c.
6¼ to 6¾ in.....	0.325c.
6¾ to 7¼ in.....	0.375c.
7¼ to 7¾ in.....	0.425c.
7¾ to 8 in.....	0.550c.

Tube round steel is to be guaranteed against rejections over 3 per cent, based on "heat lots."

When special sections are required, prices including roll costs, etc., will be quoted by individual companies upon application.

## CUTTING EXTRAS

Cutting to specified lengths, other than by machine, takes no extra on lengths 60 in. and over. On lengths over 48 in., up to, but not including 60 in., the extra is 0.10c. a lb.; on 24 to 48 in. inclusive, 0.15c.; on 12 to 24 in. inclusive, 0.30c., and on 12 in. and under, not less than 0.40c. For machine cutting to specified

lengths of rounds and squares 1½ in. and larger, lengths over 48 in. take a 0.20c. extra; lengths 24 to 48 in. inclusive, 0.30c.; lengths 12 to 24 in., 0.40c., and under 12 in., not less than 0.70c. These extras apply on material up to 0.50 carbon and under with steel of a higher carbon content being subject to special consideration. Machine cutting extras on rounds and squares under 1½ in., flats, etc., will be specially considered by individual companies.

## Extras for Machine Straightening of Bars

### ROUNDS

¾ to ½ in. inclusive.....	0.20c.
Over ½ to 1 in. inclusive.....	0.20c.
Over 1 to 1½ in. inclusive.....	0.15c.
Over 1½ to 2 in. inclusive.....	0.10c.
Over 2 in.....	No Extra

### SQUARES

¾ to ½ in. inclusive.....	0.20c.
Over ½ to 1 in. inclusive.....	0.20c.
Over 1 to 1½ in. inclusive.....	0.15c.
Over 1½ to 2 in. inclusive.....	0.10c.
Over 2 in.....	0.10c.

### HEXAGONS

Up to 1 in. inclusive.....	0.30c.
Over 1 to 1½ in. inclusive.....	0.30c.
Over 1½ to 2 in. inclusive.....	0.20c.
Over 2 in.....	0.20c.

### FLATS

Lighter than ¼ lb. per ft.....	0.30c.
¼ lb. per ft. and heavier, up to ½ lb. inclusive.....	0.25c.
Over ½ lb. per ft. and heavier, up to ¾ lb. inclusive.....	0.20c.
Over ¾ lb. per ft. and heavier, up to 2 lb. inclusive.....	0.15c.
Over 2 lb. per ft.....	0.10c.

## Quality Classification

Commercial quality bars are defined as hot rolled carbon steel bars suitable for general commercial purposes and produced in accordance with good mill practice. Standard chemical ranges may be specified, subject to ladle analysis only. Bars shall be free from defects which would be injurious for general or ordinary purposes. If subjected to special processing, such as forging, cold working or heat treating, this shall be done at user's risk. Commercial quality bars take no extra.

Forging quality bars are defined as hot rolled carbon steel bars of specified composition, in the manufacture of which special precautions are taken to produce material suitable for forging, heat treating, or similar purposes in which uniformity of composition and freedom from injurious defects are essential. Standard chemical ranges shall be specified subject to ladle and check analyses. Check analyses shall be subject to Manufacturers' Standard Permissible Variations, Procedure II. The purchaser shall inform the manufacturer as to the kind of work and type of forging for which the steel is required. Bars shall be rolled from billets with special discards or equivalent precautions against piping or excessive segregations and prepared by selection, chipping, or other methods looking to the elimination of seams and surface defects of such extent as would become injurious in the fabricated part for which the material is required. The extra for forging quality is 0.25c. a lb., as compared with 0.15c., heretofore.

Special requirement quality bars are defined as hot rolled carbon steel bars subject to special restrictions as agreed upon between manufacturer and consumer, such as the amount of discard, extra restrictive requirements on check analysis, metallographic examinations, guaranteed results on heat treatments, etc. This classification corresponds to a class heretofore designated as Guaranteed Forging Steel, and takes an extra of 0.50c. a lb.

## Extras for Chemical Specifications on Bessemer and Open-Hearth Bars and Small Shapes

### CARBON

(The mean of the range agreed upon between purchaser and manufacturer to determine the extra.)

Open-hearth 0.10 to 0.25 }.....	No Extra
Bessemer 0.08 to 0.25 }.....	No Extra
Open-hearth and Bessemer 0.26 to 0.60.....	0.05c.
Open-hearth and Bessemer 0.61 to 1.25.....	0.15c.
When maximum specified is:	
Open-hearth 0.09 }.....	0.05c.
Bessemer 0.07 }.....	0.05c.

## MANGANESE

(The mean of the range agreed upon between purchaser and manufacturer to determine the extra.)

0.30 to 0.90	No Extra
0.91 to 1.15	0.10c.
1.16 to 1.35	0.20c.
1.36 to 1.50	0.25c.
1.51 to 2.00 (No extra for forging quality)	0.65c.

NOTE: When the mean of the range agreed upon is above 1.15, the extras shall apply only to steel with maximum carbon specified 0.20 or higher, and shall not apply to structural shapes or plates. Prices for these exceptions to be quoted on application.

## SILICON

(The mean of the range agreed upon between purchaser and manufacturer shall determine the extra.)

Minimum not specified	No Extra
Up to 0.25 inclusive	0.10c.
0.26 to 0.50 inclusive	0.20c.

NOTE: Above silicon extras do not apply to structural shapes or plates.

## PHOSPHORUS

Minimum not specified	No Extra
Up to 0.08 minimum inclusive	0.05c.

NOTE: Phosphorus extra applies to open-hearth steel only.

## SULPHUR

Minimum not specified	No Extra
Up to 0.10 minimum inclusive	0.10c.
0.11 to 0.20 minimum inclusive	0.175c.
0.21 to 0.30 minimum inclusive	0.25c.

## COPPER

Minimum not specified	No Extra
Up to 0.20 minimum	0.10c.

NOTE: Extra for higher copper content to be quoted on application.

## SPECIAL EXTRAS

Annealing or normalizing	1.00c.
Pipe or box annealing	1.50c.
Heat treating	1.50c.
Special carburizing steel	0.50c.
Pickling	0.15c.
Oiling	0.10c.
Pickling and liming	0.25c.
Pickling and oiling	0.25c.

NOTES: Extras are applicable only to acceptable sizes in the chemical limits specified.

When material is ordered to physical requirements the extras for the required chemical contents shall apply.

## QUANTITY DIFFERENTIALS

"Lump sum" quantity extras will apply to all orders for less than 6000 lb. of a size to cover cost of handling and assembling. These extras are to be added to the net price of the material and are to be determined by the total weight of a size ordered, for shipment at one time. Quantities less than 6000 lb. but not less than 4000 lb. take a "lump sum" extra of \$2; less than 4000 lb. but not less than 2000 lb., \$4; less than 2000 lb. but not less than 1000 lb., \$8, and less than 1000 lb., \$12. In the Birmingham district, per lb. quantity differentials apply, lots of less than 2000 lb. but not less than 1000 lb. taking 0.25c. a lb., and less than 1000 lb., 50c. a lb.

## Structural Shapes

Structural shapes are quoted at 1.60c. a lb., base Pittsburgh, 1.70c. a lb., base Buffalo, 1.65c. base Chicago, 1.75c. base Birmingham, 1.70c. base Bethlehem, 2c. base Gulf ports (f.o.b. cars on dock), 2.15c. base Pacific Coast ports (f.o.b. cars on dock). Subject to all extras per classification of extras on structural shapes.

## ANGLES, STRUCTURAL SIZES, STANDARD GAGES

	Extra Per Pound
3 in. to 6 in. on one or both legs	Base
Over 6 in. on one or both legs	0.10c.

## SPECIAL GAGE ANGLES

6 x 6 x $\frac{1}{8}$ in.	0.10c.
5 x 5 x $\frac{1}{8}$ in.	0.10c.
4 x 4 x $\frac{1}{8}$ in.	0.30c.
3½ x 3½ x $\frac{1}{8}$ in.	0.30c.
3 x 3 x $\frac{1}{8}$ in.	0.35c.
3 x 3 x $\frac{1}{4}$ in.	0.50c.
6 x 4 x $\frac{1}{8}$ in.	0.10c.
6 x 3½ x $\frac{1}{8}$ in.	0.10c.
5 x 3½ x $\frac{1}{4}$ in.	0.15c.
5 x 3 x $\frac{1}{4}$ in.	0.15c.
4 x 3½ x $\frac{1}{4}$ in.	0.25c.
4 x 3½ x $\frac{1}{8}$ in.	0.30c.
4 x 3 x $\frac{1}{8}$ in.	0.30c.
3½ x 3 x $\frac{1}{8}$ in.	0.30c.
3½ x 2½ x $\frac{1}{8}$ in.	0.30c.
3½ x 2 x $\frac{1}{8}$ in.	0.35c.
3 x 2½ x $\frac{1}{8}$ in.	0.35c.
3 x 2 x $\frac{1}{8}$ in.	0.35c.

## LENGTH EXTRAS

Under 5 ft. to 3 ft. incl.	0.10c.
Under 3 ft. to 2 ft. incl.	0.25c.
Under 2 ft. to 1 ft. incl.	0.50c.
Under 1 ft.	1.55c.
Over 80 ft. to 90 ft. incl.	0.10c.
Over 90 ft. to 100 ft. incl.	0.15c.
Over 100 ft.	0.15c. plus 0.05c.

for every additional 5 ft. or fraction thereof.

NOTE: In any case, cutting to lengths under 5 ft. subject to prior arrangement.

Lengths over 80 ft. applicable only to those sizes which can be furnished to these over-lengths.

## QUALITY EXTRAS

Conforming to latest issue of ASTM specifications covering structural steel for either bridges or buildings or else manufacturer's standard or equivalent	Base
Hull material subject to U. S. Navy specifications for medium or soft steel	0.10c.
High tensile hull steel subject to U. S. Navy or equivalent specifications	1.00c.
Silicon steel subject to ASTM specifications A94-27 or equivalent and Hi-Ten steel:	
Standard structural shapes	0.60c.
Wide flange sections	0.75c.
Copper 0.20 per cent minimum	0.10c.

## INSPECTION

Mill's inspection No Extra

Charges for other than mill inspection, such as "Lloyd's" or "American Bureau of Shipping," are for buyer's account and will be made by the inspection bureau direct to buyer.

## United States Navy Specifications on Bars and Small Shapes

(Extras for Specification and Inspection)

Specification	Commodity	Grade	Extra
43-B-11A	Bolts, nuts and bars for same	Class "A" (Alloy) Class "B" Class "C" (no test) C.P. Nut	Alloy 0.10c. a lb. 0.10c. a lb. 0.10c. a lb.
43-R-1c	Rivet rods and rivets for hull construction	Medium High tensile (Alloy)	0.10c. a lb. Alloy
46-Slf	Shapes and bars for hull construction	Common Soft and medium High tensile (Alloy)	Base 0.10c. a lb. Alloy
46-S-2c	For Reforging	Extra soft bar steel	0.10c. a lb.
46-S-4c	Carbon steel bars for reforcing		1.00c. a lb.
43-S-19	Boiler staybolt steel		0.35c. a lb.

Charges for other than mill inspection, such as "Lloyd's," or "American Bureau of Shipping," for buyer's account.

## Concrete Reinforcing Bars

Plain or deformed new billet steel concrete reinforcing bars in stock lengths are quoted at 1.80c. a lb., Pittsburgh; 1.85c., Chicago, Gary, Cleveland, Youngstown, Buffalo or Birmingham; 2.20c., f.o.b. cars on dock at Gulf ports, and 2.35c., f.o.b. cars on dock at Pacific Coast ports. They are subject to standard extras for size and cutting to length, as defined in extra lists but apply only on standard sizes listed in the usual extra cards. A reduction of 0.20c. a lb. under the above base prices may be made to recognized fabricators, distributors or jobbers of reinforcing bars, who are able to qualify as such under the steel code in accordance with requirements approved by the directors of the American Iron and Steel Institute.

Rail steel reinforcing bars are quoted at the same basing points as new billet steel material at prices 0.05c. a lb. or \$1 a ton under new billet bar quotations. They are subject to the same size extras, but extras for cutting to length do not apply to rail steel material. All  $\frac{3}{8}$  to  $\frac{1}{4}$ -in. rail steel bars, stirrups, column ties and truss bars continuous over more than two supports are subject to a bending extra of 0.80c. a lb., while truss bars for beams and slabs, radius bending and types not described above take a bending extra of 0.30c. a lb. As in the case of new billet steel bars, the base prices on rail steel material are subject to a reduction of 0.20c. a lb. to fabricators, distributors and jobbers, who are also given a reduction of 0.05c. a lb. under the bending extras.

### Standard Sizes of Concrete Reinforcing Bars

(Rolled from new billet steel to conform with Manufacturers' Standard Specifications or others mutually acceptable.)

	Area in Sq. In.	Est. Weight Per Ft. in Lb.
* $\frac{1}{4}$ in. Round .....	0.049	0.167
$\frac{3}{8}$ in. Round .....	0.110	0.376
$\frac{1}{2}$ in. Round .....	0.196	0.668
$\frac{5}{8}$ in. Square .....	0.250	0.850
$\frac{3}{4}$ in. Round .....	0.307	1.043
$\frac{7}{8}$ in. Round .....	0.442	1.502
1 in. Round .....	0.601	2.044
1 in. Square .....	0.785	2.670
1 in. Square .....	1.000	3.400
1 $\frac{1}{4}$ in. Square .....	1.266	4.003
1 $\frac{1}{2}$ in. Square .....	1.563	5.313

\*Furnished in plain round.

### Classification and Extras for Concrete Reinforcing Bars

SECTION	Per lb. extra
$\frac{3}{8}$ to 1 $\frac{1}{4}$ in. ....	Base
$\frac{3}{8}$ in. ....	0.10c.
$\frac{1}{2}$ in. ....	0.20c.
$\frac{3}{4}$ in. ....	0.40c.
$\frac{1}{4}$ in. plain round .....	1.00c.

#### CUTTING TO SPECIFIED LENGTHS

Cutting to lengths of 60 in. and over, except as noted below .....	0.10c.
Cutting to lengths over 48 in. to, but not including, 60 in. ....	0.10c.
Cutting to lengths over 24 in. to 48 in., inclusive .....	0.15c.
Cutting to lengths over 12 in. to 24 in., inclusive .....	0.30c.
Cutting to lengths of 12 in. and under, not be less than ..	0.40c.

NOTE: Extra for cutting to lengths 60 in. and over will not be assessed under the following conditions:

(1) Provided shipment of shorts not exceeding 10 per cent of the total quantity ordered is permitted:

(2) Provided leeway in length is permitted as follows:  
Lengths 5 ft. to 30 ft., inclusive.....2 ft. leeway  
Lengths over 30 ft. to 40 ft., inclusive.....3 ft. leeway  
Lengths over 40 ft. ....5 ft. leeway

### Plates

Plates are quoted at 1.60c. a lb., base Pittsburgh; 1.65c. a lb., base Chicago; 1.65c., base Gary; 1.75c., base Birmingham; 1.70c., base Coatesville, Pa.; 1.70c., base Sparrows Point, Md.; 2c., base Gulf ports (f.o.b. cars on dock); 2.15c., base Pacific Coast ports (f.o.b. cars on dock). Subject to all extras per standard classification of extras on steel plates.

### Plates

Extras to be Added to Base Price of Plates  
Extras Are Given in Cents per Pound

#### GENERAL CONDITIONS

Plates are described as follows:

Over 6 in. wide to 48 in. incl. in width—0.250 (10.2 lb.) and thicker.

Over 48 in.—0.1875 (7.65 lb.) and thicker.

Rectangular plates, of tank steel or Manufacturers' Standard structural steel, or equivalent; over 6 in. to 100 in. inclusive, in width;  $\frac{1}{4}$  in. to 2 in. inclusive in thickness, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered  $\frac{1}{4}$ -in. plates. Plates over 72 in. wide must be ordered  $\frac{1}{4}$  in. thick on edge, or not less than 11 lb. per sq. ft., to take base price.

Plates over 72 in. wide, ordered less than 11 lb. per sq. ft. down to the weight of 3/16 in., take the price of 3/16-in. plates and all extras for width of 3/16-in. plates as well as gage extras.

Allowable overweight for rectangular plates, whether ordered to gage or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

All sketches, including circles, are invoiced at actual weight and are not subject to weight tolerances applying to rectangular plates.

Any charges for inspection, such as "Lloyd's," "American Bureau of Shipping," or any other "Inspection Bureaus," to be a matter of arrangement between the buyer and the inspection company and for buyer's account.

Each extra listed herein is a separate and distinct extra and does not, unless otherwise noted, include or absorb any other extra listed. Full extra applying over base price is the total of all extras applicable to specified requirements of the order.

#### GAGE EXTRAS

Gages lighter than $\frac{1}{4}$ in. and including 3/16 in. on thin edge over 48 in. wide to 72 in. wide, inclusive.....	0.20c.
Plates over 72 in. wide ordered 7.65 lb.....	0.30c.
Plates over 2 in. thick, subject to physical test requirements—Over 2 in. thick, up to and including 4 in.....	0.50c.
Over 4 in. thick .....	0.75c.

#### WIDTH OR DIAMETER EXTRAS

All Plates, Rectangular or Otherwise (Applies to plates $\frac{1}{4}$ in. thick and heavier but not less than 11 lb. per sq. ft. if ordered to weight.)	
Widths over 100 in. to 110 in., incl.....	0.05c.
Widths over 110 in. to 115 in., incl.....	0.10c.
Widths over 115 in. to 120 in., incl.....	0.15c.
Widths over 120 in. to 125 in., incl.....	0.25c.
Widths over 125 in. to 130 in., incl.....	0.50c.
Widths over 130 in. to 140 in., incl.....	0.75c.
Widths over 140 in. to 155 in., incl.....	1.00c.

#### WIDTH EXTRAS FOR WIDE LIGHT PLATES

All Plates, Rectangular or Otherwise (Applies to Plates less than $\frac{1}{4}$ in. gage or lighter than 11 lb. per sq. ft.)	
Widths over 72 in. to 84 in., incl.....	0.10c.
Widths over 84 in. to 96 in., incl.....	0.20c.
Widths over 96 in. to 100 in., incl.....	0.30c.
Widths over 100 in. to 110 in., incl.....	0.40c.
Widths over 110 in. to 115 in., incl.....	0.45c.
Gage and cutting extras, where applicable, are in addition to extras for widths or diameters.	

#### CUTTING EXTRAS

Length or Diameter All Plates, Rectangular or Otherwise 3 ft. and over up to published limit of length, but not over 80 ft. ....	No Extra
Under 3 ft. to 2 ft. ....	0.25c.
Under 2 ft. to 1 ft. ....	0.50c.
Under 1 ft. ....	1.55c.
Over 80 ft. to and including 90 ft.....	0.10c.
Over 90 ft. to and including 100 ft.....	0.15c.
Over 100 ft., 0.15c. plus 0.05c. for every additional 5 ft. or fraction thereof.	

#### REGULAR SKETCHES

With Not More Than Four Straight Edges (Including straight taper plates)	
Additional extra .....	0.20c.

#### IRREGULAR SKETCHES

With More Than Four Straight Edges (Sketches cannot be sheared with reentrant angles)	
Additional extra .....	0.50c.

## QUALITY EXTRAS

Copper steel (copper 0.20 per cent minimum).....	0.10c.
Pressing steel (not flange steel for boilers).....	0.10c.
Flange steel, boiler quality .....	0.15c.
Ordinary firebox steel .....	0.20c.
Stillbottom steel .....	0.30c.
Locomotive firebox steel .....	0.50c.
Structural silicon steel, A.S.T.M. A-94 .....	0.75c.

## SPECIAL REQUIREMENTS

Specified amount of discard, not to exceed 50 per cent, total .....	0.40c.
Segregation tests (other than check analysis and homogeneity tests covered in A.S.T.M. and A.S.M.E. standard specifications) involving check analysis or fracture tests from top of plate.....	0.25c.
Tension tests from top of plate, i.e., other than at the side according to standard practice under A.S.T.M. or A.S.M.E. specifications .....	0.25c.
Etch tests .....	0.25c.
When physical tests are specified beyond those called for in A.S.T.M. specifications of a similar grade and other than provided on this card for each additional test..	0.10c.

## EXTRAS FOR SPECIFIED CARBON

Carbon 0.10 to 0.25 .....	No extra
Carbon 0.25 to 0.40 .....	0.10c.
Carbon 0.41 to 0.60 .....	0.25c.
The mean of the range shall determine the extra. The range shall be not less than 10 points.	

## NORMALIZING

Normalizing for relieving or adjusting rolling or cutting stresses .....	0.50c.
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## PICKLING, OILING AND ANNEALING

PLATES—6-1/16 in. wide to 23-15/16 in. wide inclusive, 1/4 in. to 3/4 in. incl. in thickness	
Pickling .....	0.25c.
Annealing .....	0.15c.
PLATES—24 in. wide to 48 in. wide inclusive, 1/4 in. to 3/4 in. incl. in thickness	
Over 48 in. wide to 65 in. wide inclusive, 3/16 in. to 1/2 in. incl. in thickness	
Pickling .....	0.15c.
Oiling .....	0.10c.
Annealing .....	0.15c.

# What Is a Jobber?—The Official Definition

THE following regulations are prescribed by the board of directors of American Iron and Steel Institute under section 4 of schedule E of the code of fair competition of the iron and steel industry, dated Aug. 17, 1933, with reference to deductions from the price of any product that may be allowed to jobbers:

1. Wherever used in these regulations, unless the context shall otherwise clearly indicate, the terms which are defined in article I of said code and in section 1 of schedule E thereof shall have the respective meanings therein set forth.

2. For the purposes of section 4 of schedule E of the code and of these regulations, any person, firm, association or corporation shall be deemed to be a jobber in respect of any product or products, as the term "products" is defined in the code, if

(a) he is (or in good faith is about to become) engaged in the business of purchasing such product or products for resale and of selling it or them in the United States without processing or fabricating it or them;

(b) he regularly owns and maintains in the United States a sufficient stock of such product or products to enable him to meet ordinary demands upon him for such product or products and as a rule purchases it or them in car-load lots;

(c) at least 75 per cent of his annual sales of such product or products have been and are (or will be) made to one or more of the following named classes of purchasers: retail dealers, manufacturers who use annually substantial quantities of such product or products, contractors, public service corporations, oil producing and/or refining corporations, gas producing corporations, pipe line corporations and mining corporations; and

(d) he employs traveling salesmen who regularly call upon and solicit orders from one or more of the classes of purchasers named in the foregoing clause (c).

For the purpose of these regulations, the terms "processing" and "fabricating" as used herein shall not include cutting to length or size, bending or, in the case of pipe, threading or coupling.

3. Pursuant to the provisions of section 4 of schedule E of the code, before any member thereof shall allow any deduction from the price of any product to any jobber as permitted by the provisions of said section, such member shall secure from such jobber an agreement substantially in the appropriate one of the three forms of agreement prescribed and designated as schedules 1, 2 and 3, respectively. Any such agreement may cover one or more products, and every such agreement shall state therein the product or products covered thereby.

4. Each member of the code shall prepare and mail, postage prepaid, to the secretary, for filing in his office, lists showing the respective names and addresses of the jobbers with whom it shall have made agreements as required by the provisions of the foregoing paragraph 3, and the kinds of products covered by them, respectively, as follows:

(a) on or before Oct. 5, 1933, a list showing the names and addresses of the jobbers with whom such member of the code, prior to Oct. 1, 1933, made such agreements, and the kinds of products covered by them, respectively;

(b) on or before the fifth day of each month beginning with the month of November, 1933, a

list showing the names and addresses of the jobbers with whom such member of the code made such agreements during the preceding calendar month, and the kinds of products covered by them, respectively; and

(c) on or before Jan. 20, 1934, and thereafter on or before the twentieth day of July and January in each year, a revised list showing the names and addresses of all the jobbers with whom, prior to the first day of July or January, as the case may be, such member of the code had made such agreements that were then in effect, and the kinds of products covered by them, respectively.

5. Any jobber who shall violate any such agreement shall, for all purposes of the code and of these regulations, thereupon cease to be a jobber, unless and until reinstated as such by order of the board of directors.

6. Notwithstanding the fact that any person, firm, association or corporation in any such agreement shall have made representation that such person, firm, association or corporation is a jobber within the meaning of the term "jobber" as it is defined in these regulations, nevertheless the member of the code which shall have made such agreement shall make reasonable inquiry for the purpose of determining that such representation was correct, and thereafter from time to time such member shall make like inquiry for the purpose of determining whether such person, firm, association or corporation is at the time a jobber within the meaning of that term as aforesaid.

Prescribed by the board of directors Aug. 29, 1933.

# Important Reclassification of Flat-Rolled Steel

Confusion resulting from the absence of a clear-cut division between bars, plates, hot-rolled strip, hot-rolled sheets, hot-rolled annealed sheets and cold-rolled sheets will in the future be avoided, since each product is now clearly defined, as shown in the table.

	RANGES WIDTH AND GAGE, ALL INCLUSIVE				
	3 1/2 in. and narrower	3-9/16 in. to 6 in.	6-1/16 in. to 23-15/16 in.	24 in. to 48 in.	48-1/16 in. and wider
HOT-ROLLED TO BE SOLD AS:					
Bars	0.250 in. and thicker	0.250 in. and thicker			
Plates			0.250 in. and thicker	0.250 in. and thicker	0.1875 in. and thicker
Hot-Rolled Strip	0.249 in. to 0.025 in.	0.249 in. to 0.035 in.	0.249 in. to 0.059 in.		
Hot-Rolled Sheets				0.249 in. to 0.059 in. (16 gage)	0.1874 in. to 0.059 in. (16 gage)
Hot-Rolled Annealed Sheets	0.024 in. and thinner (24 gage)	0.034 in. and thinner (21 gage)	0.058 in. and thinner (17 gage)	0.058 in. and thinner (17 gage)	0.058 in. and thinner (17 gage)
COLD-ROLLED TO BE SOLD AS:					
Cold-Rolled Strip	12 in. and narrower		Over 12 in. to 23-15/16 in., incl.		24 in. and wider
Cold-Rolled Sheets	All thicknesses		0.029 in. and thicker		
			0.028 in. and thinner		All thicknesses and gages

NOTE: All cold-rolled material in coils, all gages and in widths up to and including 23-15/16 in. to be sold on cold-rolled strip base and card of extras.

## Hot-Rolled Sheets

Sheet prices are quoted at the following basing points: Pittsburgh, Gary, Ind., Birmingham and Pacific Coast ports. Base prices are as indicated in our price pages. Subject to extras per standard classification of extras for sheets.

## Hot-Rolled and Hot-Rolled Annealed—Size Extras, Cents Per 100 Lb.

### HOT-ROLLED AND HOT-ROLLED PICKLED (16 ga. and heavier)

WIDTH, IN.		Over			
48	60	66	72	78	
to	to	to	to	to	
60	66	72	78	84	
12 ga. and heavier.....	15	20	25	35	35
13 ga. to 16 ga., inc. ....	15	25	30	..	..

### Hot-Rolled and Hot-Rolled Annealed Sheets—Gage Differentials

#### HOT-ROLLED SHEETS

Thickness Ordering Range, In.	Approx. Decimal Thickness, In.	Gage Number	Differentials per 100 lb.
0.193 to 0.249		6 and hvr.	BASE
0.177 to 0.192	0.1875	7	BASE
0.161 to 0.176	0.1719	8	BASE
0.146 to 0.160	0.1563	9	BASE
0.131 to 0.145	0.1406	10	BASE
0.115 to 0.130	0.125	11	Add 0.05
0.099 to 0.114	0.1094	12	Add 0.05
0.084 to 0.098	0.0938	13	Add 0.10
0.073 to 0.083	0.0781	14	Add 0.15
0.066 to 0.072	0.0703	15	Add 0.20
0.059 to 0.065	0.0625	16	Add 0.25

LENGTH, IN.		Over	Under
144	192	216	30
to	to	to	to
192	216		24
16 ga. and heavier....	5	5	10
			15

### HOT-ROLLED ANNEALED AND HOT-ROLLED ANNEALED PICKLED (17 ga. and lighter)

WIDTH, IN.		Over				Under			
32	36	40	44	48	52	56	60	64	24
to	to	to	to	to	to	to	to	to	to
48	52	56	60	64	68				12
17-18. ..	..	..	..	..	20	20	20	30	40
19-20. ..	..	..	..	..	20	20	30	40	50
21 ..	..	..	05	10	20	30	40	50	60
22 ..	..	10	15	25	40	60	80	..	23-24
23-24 ..	10	20	30	50	70	100	..	..	25-30
25-27. ..	15	30	50	60	..	..	..	..	20
28 ..	15	25	35	60	..	..	..	..	30
29 ..	20	35	..	..	..	..	..	..	60
30 ..	20	40	..	..	..	..	..	..	1.00

LENGTH, IN.		
Over		Under
144	168	30
to	to	to
168	192	24
15	25	15
20	30	15
25	35	15
30	..	15
..	..	15

#### HOT-ROLLED ANNEALED SHEETS

Thickness Ordering Range, In.	Approx. Decimal Thickness, In.	Gage Number	Differentials per 100 lb.
0.053 to 0.058	0.0563	17	Deduct 0.20
0.047 to 0.052	0.050	18	Deduct 0.15
0.041 to 0.046	0.0438	19	Deduct 0.15
0.036 to 0.040	0.0375	20	Deduct 0.10
0.033 to 0.035	0.0344	21	Deduct 0.10
0.030 to 0.032	0.0312	22	Deduct 0.05
0.027 to 0.029	0.0281	23	Deduct 0.05
0.024 to 0.026	0.025	24	BASE
0.0199 to 0.023	0.0219	25	Add 0.05
0.0178 to 0.0198	0.0188	26	Add 0.10
0.0161 to 0.0177	0.0172	27	Add 0.15
0.0146 to 0.0160	0.0156	28	Add 0.25
0.0131 to 0.0145	0.0141	29	Add 0.40
0.0115 to 0.0130	0.0125	30	Add 0.50
		31	Add 0.75
		32	Add 1.00

Thickness ordering range given in the above table is for pricing purposes only and does not apply to thickness which governs allowable variations.

Hot-Rolled, Hot-Rolled Pickled, Hot-Rolled Annealed and Hot-Rolled Annealed Pickled—

Miscellaneous Extras, Per 100 Lb.

PICKLING EXTRAS:

	Pickling	Oiling
12 ga. and heavier.....	\$0.15	\$0.10
13-16 ga., inc. ....	0.20	0.10
17 ga. and lighter.....	0.35	0.10

DRAWING EXTRAS:

12 ga. and heavier.....	\$0.15
13-21 ga., inc. ....	0.25
22 ga. and lighter.....	0.35

The above drawing extras are to apply wherever the customer requires the supplier to stand for a drawing hazard or surface disturbance.

Extra smooth (Hot rolled and hot rolled annealed unpickled only) ..... \$0.25

Blueed Sheets	Steam or air blue, 25 ga. and lighter (hot rolled annealed only) .....	0.20
	Steam or air blue 24 ga. and heavier (hot rolled annealed pickled) .....	0.50

Patent or stretcher leveled (not resquared)..... 0.25

Resquaring—side and end and/or sides and ends—add 5 per cent of net item price at time of resquaring. Any sheet that comes within resquaring tolerance the resquaring extra must be added.

Tack plate quality (in addition to size extras)..... 0.20

Oiling ..... 0.10

Lime finish ..... 0.10

Deoxidizing ..... 0.15

Extra box annealing..... 0.15

Copper bearing steel..... 0.15

CARBON EXTRAS:

Over 0.25 to 0.40 per cent..... \$0.10

Over 0.40 to 0.60 per cent..... 0.25

Over 0.60 to 0.90 per cent..... 0.40

The mean of the range must determine the carbon extra; the range shall not be less than ten points (0.10).

Circle shearing extras on application.

Painting (sheets one coat).

Red Oxide of Iron

17 to 18 ga. ....	\$0.15
19 to 24 ga. ....	0.20
25 to 28 ga. ....	0.25

Priming Coat on Ceiling Stock

28 ga. ....	0.25
29 and 30 ga. ....	0.35

HOT-ROLLED SHEETS 16 GA. AND HEAVIER

Hot pressing steel .....	\$0.10
Flange steel .....	0.15
Ordinary firebox steel.....	0.20
Locomotive firebox steel.....	0.50
U. S. Navy 48-S-5-D (Medium or soft).....	0.25
Regular sketches .....	0.20
Irregular sketches .....	0.50

STANDARD SIZES

Hot rolled sheets

All gages  
Widths: 24, 26, 28, 30, 36,  
42, 48, 60; also 72 in. in  
gages heavier than No. 13.  
Lengths: 72, 84, 96, 120 and  
144 in.

Hot Rolled Annealed Sheets

24 and heavier: Even gages  
26 and lighter: All gages  
Widths: 24, 26, 28, 30, 36  
in.  
Lengths: 72, 84, 96, 120 in.

Quantity Extras Applying on Hot-Rolled and Hot-Rolled Annealed Sheets, No. 12 Gage and Lighter

STANDARD SIZE QUANTITY EXTRAS IN CARLOAD LOTS

Any item of standard size ordered as part of carload but less than 10 bundles (approx. 1500 lb.) 10c. per 100 lb. extra for the item.—10 bundles or over (approx. 1500 lb.) in standard size, no charge.

STANDARD SIZE QUANTITY EXTRAS IN LESS CARLOAD LOTS (total of order)

	Per 100 lb.
Less than 10 bdl. or 1500 lb.....	\$0.75
10 bdl. and less than 25 bdl. or 1500 lb. and less than 3750 lb. ....	0.50
25 bdl. and less than 100 bdl. or 3750 lb. and less than 15,000 lb. ....	0.25
100 bdl. or 1500 lb. up to carload.....	0.10
Bundles estimated at 150 lb. average.	

ODD SIZE QUANTITY EXTRAS IN CARLOAD LOTS

Any item of odd size ordered as part of carload but less than 10 bdl. (approx. 1500 lb.) 10c. per 100 lb. extra for the item.—10 bdl. or over (approx. 1500 lb.) in odd size, no extra.

QUANTITY EXTRAS IN LESS CARLOAD LOTS

Each item of a size—Under 5,000 lb. to 2,500 lb.....	\$0.10
Under 2,500 lb. to 1,000 lb.....	0.25
Under 1,000 lb.....	0.50
For shipment of exact quantities .....	0.10

When odd sizes are ordered shipment of 10 per cent over or under each item of quantity ordered is permissible.

CRATING EXTRAS PER 100 LB.

	Wrapping	Crating
350 to 500 lb. ....	\$0.10	\$0.40
300 to 349 lb. ....	0.20	0.50
250 to 299 lb. ....	0.20	0.60
200 to 249 lb. ....	0.20	0.70
150 to 199 lb. ....	0.20	0.80

Crates of less than 150 lb., \$1.75 per crate, for the crating, 40c. per crate for the wrapping.

Tight boxes, 350 to 500 lb.....\$0.60 per 100 lb.

Tight boxes, 350 to 500 lb., paper lined..... 0.70 per 100 lb.

All crates will contain 350 lb. to 500 lb. unless otherwise specified. No shipments will be wrapped unless so specified.

NOTE: Package approximately 5000 lb.....No Extra

Cold-Rolled Sheets

Heavy and Light Cold-Rolled Sheets—Gage Differentials

HEAVY COLD-ROLLED SHEETS

Thickness Ordering Range, In.	Approx. Decimal Thickness, In.	Gage Number	Differentials Per 100 Lb.
0.177 to 0.192	0.1875	7	Base
0.161 to 0.175	0.1719	8	Base
0.146 to 0.160	0.1563	9	Base
0.131 to 0.145	0.1406	10	Base
0.115 to 0.130	0.125	11	Add \$0.05
0.099 to 0.114	0.1094	12	Add 0.05
0.084 to 0.098	0.0938	13	Add 0.10
0.073 to 0.083	0.0781	14	Add 0.15
0.066 to 0.072	0.0703	15	Add 0.20
0.059 to 0.065	0.0625	16	Add 0.25

LIGHT COLD-ROLLED SHEETS

0.053 to 0.058	0.0563	17	Deduct \$0.15
0.047 to 0.052	0.050	18	Deduct 0.10
0.041 to 0.046	0.0438	19	Deduct 0.05
0.036 to 0.040	0.0375	20	Base
0.033 to 0.035	0.0344	21	Add 0.05
0.030 to 0.032	0.0312	22	Add 0.10
0.027 to 0.029	0.0281	23	Add 0.15
0.024 to 0.026	0.025	24	Add 0.20
0.0199 to 0.023	0.0219	25	Add 0.25
0.0178 to 0.0198	0.0188	26	Add 0.30
0.0161 to 0.0177	0.0172	27	Add 0.35
0.0146 to 0.0160	0.0156	28	Add 0.45
0.0131 to 0.0145	0.0141	29	Add 0.55
0.0115 to 0.0130	0.0125	30	Add 0.65

Thickness ordering range given in the above table is for pricing purposes only and does not apply to thickness which governs allowable variations.

Cold-rolled sheets must be sold with seconds arising up to the following percentages either included or in addition to tonnage on the order.

Price of seconds when shipped with prime orders shall be 10 per cent off net item prime price at basing point.

	Per Cent
0.036 in. and heavier, 42 in. wide and under .....	15
0.036 in. and heavier, over 42 to 48 in. ....	20
0.036 in. and heavier, over 48 in. ....	35
0.035 to 0.030 in., 36 in. wide and under .....	20
0.035 to 0.030 in., over 36 in. ....	35
0.029 in. and lighter, all widths .....	35

# Heavy and Light Cold-Rolled Sheets—Size Extras, Cents per 100 Lb.

Gage	Widths, In.												Under
	Over												
	32	36	40	44	48	52	56	60	64	68	72	24	
	to	to	to	to	to	to	to	to	to	to	to	to	
16 and heavier ..	36	40	44	48	52	56	60	64	68	72	78	12	
17 and 18 .....	..	..	..	..	15	15	20	25	35	45	..	..	
19 and 20 .....	..	..	..	..	20	20	20	30	40	50	60	..	
21 .....	..	..	10	20	30	40	50	60	..	..	..	..	
22 .....	..	15	30	45	60	75	1.00	..	..	..	..	..	
23 and 24 .....	..	20	40	60	80	..	..	..	..	..	..	15	
25 and 27 .....	..	30	60	90	..	..	..	..	..	..	..	20	
28 .....	20	40	80	1.20	..	..	..	..	..	..	..	20	
29 .....	30	60	90	..	..	..	..	..	..	..	..	20	
30 .....	40	80	..	..	..	..	..	..	..	..	..	20	

Gage	Length, In.								
	Over					Under			
	98	108	120	132	144	30	18	10	
	to	to	to	to	to	to	to	to	
	108	120	132	144	156	18	10	6	
16 and heavier . . . .	..	..	..	..	10	15	25	45	
17 and 18 . . . . .	..	..	10	10	15	15	25	45	
19 and 20 . . . . .	..	10	10	15	20	15	25	45	
21 and 22 . . . . .	10	15	20	25	30	15	25	45	
23 and 27 . . . . .	15	20	25	30	35	15	25	45	
28 and 30 . . . . .	20	25	30	35	40	15	25	45	

## Heavy and Light Cold-Rolled Sheets—Miscellaneous Extras, per 100 Lb.

### DRAWING QUALITY:

12 ga. and heavier	.....\$0.15
13 ga.—21 ga., inc.	.....0.25
22 ga. and lighter	......35

The above drawing extras are to apply wherever the customer requires the supplier to stand for a drawing hazard or surface disturbance.

Hood top quality	.....\$0.25
Oiling	.....0.10
Patent or stretcher leveled (not resquared)	.....0.25
Resquaring—Add 5 per cent of net item price at time of resquaring.	

Any sheet that comes within resquaring tolerance, the resquaring extra must be added.

### QUANTITY EXTRAS:

Each item of a size—Under 5,000 lb. to 2,500 lb.	.....\$0.10
Under 2,500 lb. to 1,000 lb.	.....0.25
Under 1,000 lb.	.....0.50
For shipment of exact quantities	0.10

When odd sizes are ordered shipment of 10 per cent over or under each item of quantity ordered is permissible.

### CRATING EXTRAS:

	Wrapping	Crating
350 to 500 lb.	\$0.10	\$0.40
300 to 349 lb.	0.20	0.50
250 to 299 lb.	0.20	0.60
200 to 249 lb.	0.20	0.70
150 to 199 lb.	0.20	0.80

Crates of less than 150 lb., \$1.75 per crate, for the crating, 40c. per crate for the wrapping.

Tight boxes, 350 to 500 lb. \$0.60  
Tight boxes, 350 to 500 lb., paper lined. 0.70

All crates will contain 350 to 500 lb. unless otherwise specified. No shipments will be wrapped unless so specified.

NOTE: Packages approximately 5000 lb. No Extra

Other miscellaneous extras applicable to this grade, see under hot rolled, hot rolled pickled, hot rolled annealed and hot rolled annealed pickled miscellaneous extras.

## Galvanized Sheets

### Galvanized Sheets Gage Differentials

Gage	Per 100 lb.
10 & heavier	Deduct.....\$0.50
11	Deduct.....0.45
12	Deduct.....0.40
13	Deduct.....0.35
14	Deduct.....0.30
15 & 16	Deduct.....0.25
17	Deduct.....0.20
18 & 19	Deduct.....0.15

20 & 21	Deduct.....0.10
22 & 23	Deduct.....0.05
24	base
25	Add.....0.15
26	Add.....0.25
27	Add.....0.35
28	Add.....0.50
29	Add.....0.75
30	Add.....1.00
31	Add.....1.25
32	Add.....1.50

### Standard Gages and Sizes

All Even Gages—Also No. 27 and No. 29 Gages.

Widths—24, 26, 28, 30 and 36 in.

Lengths—72, 84, 96 and 120 in.

### Galvanized Sheet Weight Table

Gage	In Ounces	In Lb.	Gage	In Ounces	In Lb.
No.	Avoldupois	Avoldupois	No.	Avoldupois	Avoldupois
8	112.5	7.031	21	24.5	1.531
9	103.5	6.406	22	22.5	1.406
10	92.5	5.781	23	20.5	1.281
11	82.5	5.156	24	18.5	1.156
12	72.5	4.531	25	16.5	1.031
13	62.5	3.906	26	14.5	.906
14	52.5	3.281	27	13.5	.844
15	47.5	2.969	28	12.5	.781
16	42.5	2.656	29	11.5	.719
17	38.5	2.406	30	10.5	.656
18	34.5	2.156	31	9.5	.594
19	30.5	1.906	32	9.0	.563
20	26.5	1.656			

### Allowable Variations for Weight

No. 16 Gage and heavier	.....Plus or Minus 5 per cent
No. 17 to No. 22 gage inclusive	.....Plus or Minus 3½ per cent
No. 23 Gage and lighter	.....Plus or Minus 2½ per cent

### Table of Extras on Galvanized Sheets

Weights when ordered.

Heavier than Regular Commercial Coatings.

Extras based on Weight Test and Spelter at 5c. or lower.

Spelter Prices considered to be on E. St. Louis Base.

Gage	Commercial Ga.	Coatings Diff.	From 1.50 to 1.75 oz. Inc. per Sq. Ft.	Over 1.75 to 2.00 oz. Inc. per Sq. Ft.	Over 2.00 to 2.25 oz. Inc. per Sq. Ft.	Over 2.25 to 2.50 oz. Inc. per Sq. Ft.	Over 2.50 to 2.75 oz. Inc. per Sq. Ft.
25 Ga. & Lighter			Per 100 lb.	Per 100 lb.	Per 100 lb.	Per 100 lb.	Per 100 lb.
			Add \$0.40	Add \$0.60	Add \$0.80	Add \$1.00*	Add \$1.20
* See Note							
24	0.25	0.35	0.45	0.55*	0.65		
21-23	0.25	0.35	0.45	0.55	0.65		
19-20	0.25	0.35	0.45	0.55	0.65		
18	0.25	0.35	0.45	0.55	0.65		
15-17	0.25	0.25	0.25	0.30	0.35		
12-14	None	0.25	0.25	0.30	0.35		
10-11	None	0.25	0.25	0.30	0.35		

### For Additional Advances of 1c. per lb. for Spelter

When Spelter is 6c. per lb. add 20 per cent to extra for coating stipulated.

When Spelter is 7c. per lb. add 40 per cent to extra for coating stipulated.

When Spelter is 8c. per lb. add 60 per cent to extras for coating stipulated.

When Spelter is 9c. per lb. add 80 per cent to extras for coating stipulated.

When Spelter is 10c. per pound add 100 per cent to extra for coating stipulated.

NOTE:—When the maximum coating in a given column is demanded—use the extra shown in the next higher column. Example: If 2 oz. minimum is desired use extra shown in "Over 2.00 to 2.25 oz" column.

NOTE:—Use nearest even cent of the F.O.B. East St. Louis quotation for spelter of the most recent issue of the *American Metal Market*; if the quotation is even half-cent, use the next higher even cent. If a range is given, and the minimum of the range is even half-cent or more, use the next higher even cent.

# Galvanized Sheets Size Extras (Per 100 Lb.)

## WIDTH (INCHES)

GAGE	OVER						UNDER					
	32 to 36	36 to 38	38 to 40	40 to 42	42 to 44	44 to 46	46 to 48	48 to 50	50 to 52	52 to 54	54 to 56	56 to 58
12 Ga. and hvr. ....	.....	.....	.....	\$0.05	\$0.10	\$0.20	\$0.20	\$0.30	\$0.35	\$0.40	\$0.20	\$0.25
13-15 .....	.....	.....	.....	0.05	0.10	0.20	0.20	0.30	0.35	0.40	0.20	0.25
16 .....	.....	\$0.05	\$0.05	0.05	0.10	0.20	0.20	0.30	0.35	0.45	0.20	0.25
17-18 .....	.....	0.05	0.05	0.05	0.10	0.20	0.25	0.35	0.40	0.55	0.20	0.30
19-21 .....	.....	0.10	0.15	0.15	0.30	0.35	0.40	0.45	0.50	0.75	0.20	0.30
22 .....	.....	0.20	0.30	0.35	0.45	0.55	0.65	0.80	0.90	1.15	0.20	0.30
23-24 .....	.....	0.25	0.35	0.45	0.55	0.65	0.75	0.90	1.00	.....	0.20	0.30
25-26 .....	.....	0.30	0.45	0.65	0.75	0.85	1.00	.....	.....	.....	0.25	0.35
27 .....	\$0.05	0.40	0.50	0.70	0.80	1.00	1.25	.....	.....	.....	0.25	0.35
28 .....	0.20	0.50	0.65	.....	.....	.....	.....	.....	.....	.....	0.25	0.35
29-30 .....	0.20	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.25	0.35
31 .....	0.40	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.25	0.35
32 .....	0.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	0.25	0.35

## LENGTH (INCHES)

GAGE	OVER				UNDER			
	124 to 144	144 to 156	156 to 168	168 to 192	192 to 216	216 to 240	240 to 264	264 to 288
12 Ga. and hvr. ....	.....	\$0.25	\$0.50	\$0.75	\$0.75	\$0.10	\$0.20	.....
13-15 .....	.....	0.25	0.50	0.75	.....	0.10	0.20	.....
16 .....	.....	0.25	0.50	0.75	.....	0.10	0.20	.....
17-18 .....	\$0.10	0.50	0.75	.....	.....	0.20	0.30	.....
19-21 .....	0.10	0.50	0.75	.....	.....	0.20	0.30	.....
22 .....	0.10	0.50	0.75	.....	.....	0.20	0.30	.....
23-24 .....	0.10	.....	.....	.....	.....	0.20	0.30	.....
25-26 .....	0.10	.....	.....	.....	.....	0.25	0.35	.....
27 .....	0.10	.....	.....	.....	.....	0.25	0.35	.....
28 .....	0.10	.....	.....	.....	.....	0.25	0.35	.....
29-30 .....	0.10	.....	.....	.....	.....	0.25	0.35	.....
31 .....	.....	.....	.....	.....	.....	0.25	0.35	.....
32 .....	.....	.....	.....	.....	.....	0.25	0.35	.....

If minimum of the range is less than half-cent, use next lower even cent.

## Spot Test

If coating is to be subjected to spot test, add 25 per cent to gross extra for the coating stipulated.

## Galvanized Sheets Miscellaneous Extras

Stretcher leveling .....	\$0.40 Per 100 Lb.
Resquaring—(If not stretcher leveled) ....	7½ per cent
Resquaring—(If stretcher leveled) .....	12½ per cent
Windmill quality (stiff) .....	0.15 Per 100 Lb.
Copper bearing .....	0.15 Per 100 Lb.

## DRAWING EXTRAS:

Per 100 Lb.

12 Gage and heavier .....	\$0.15
13 to 21 Gage, inclusive .....	0.25
22 Gage and lighter .....	0.35

Drawing extras apply if responsible for drawing hazard or surface disturbance.

Circle extras on application.

## Galvanized Seconds

Seconds arising in the production of galvanized sheets when shipped with primes (but not roofing sizes) and not to exceed 5 per cent of total quantity shipped shall be sold at 50c. for 25 gage and lighter, and 75c. for 24 gage and heavier less than item price of primes.

Seconds and wasters are not to be sold to any buyer for conversion into roofing.

## Tin Mill Black Plate

Tin mill black plate is quoted at 2.50c. per lb., base Pittsburgh, 2.60c. per lb., base Gary, and 3.15c. a lb., f.o.b. cars on dock at Pacific Coast ports. (Add extras)

## Hot-Rolled and Annealed—Gage Differential

Nos. 15-16 gage.....	Deduct \$0.20 per 100 lb.
Nos. 17-21 gage.....	Deduct 0.15 per 100 lb.
Nos. 22-24 gage.....	Deduct 0.10 per 100 lb.
Nos. 25-27 gage.....	Deduct 0.05 per 100 lb.
No. 28 gage.....	Base
No. 29 gage.....	Add 0.10 per 100 lb.
No. 30 gage.....	Add 0.20 per 100 lb.

FOR BETTER GRADES OF TIN MILL BLACK, add to hot rolled and annealed prices as follows:

Milk can stock .....	\$0.75 per 100 lb.
Nickel plating stock .....	1.00 per 100 lb.
Pickled and annealed .....	0.40 per 100 lb.
Pickled, annealed, cold rolled and annealed (full finish) .....	0.50 per 100 lb.
Show card stock .....	0.75 per 100 lb.
Show card stock, special .....	1.00 per 100 lb.
Stove pipe stock, blued .....	0.20 per 100 lb.
Tea tray stock .....	0.75 per 100 lb.
Tea tray stock, special .....	1.00 per 100 lb.
Extra annealing .....	0.15 per 100 lb.
Deoxidizing .....	0.15 per 100 lb.
Oiling .....	0.10 per 100 lb.
Welding quality .....	0.10 per 100 lb.

DRAWING QUALITY—Add 25c. per 100 lb. (regardless of gage)  
NOTE—The above drawing extra applies to material intended for any article wherever the customer holds the supplier responsible for a fabricating hazard, or a hazard due to surface disturbance.

## QUANTITY—

Items less than 5,000 lb. to 2,500 lb.	Add 0.10 per 100 lb.
Items less than 2,500 lb. to 1,000 lb.	Add 0.25 per 100 lb.
Items less than 1,000 lb.....	Add 0.50 per 100 lb.

## BOXING—

Extra per 100 lb. Extra per 100 lb.

	Up to 24 in. wide	Over 24 in. to 30 in. wide
Under 40 in. long.....	\$0.20	\$0.30
40 in. to 45 in. long.....	0.30	0.40
Over 45 in. long.....	0.40	0.50

## RESQUARING—

Ends Ends and Sides

No. 28 gage and heavier..	\$0.15 per 100 lb.	\$0.20 per 100 lb.
Lighter than No. 28 gage..	0.20 per 100 lb.	0.30 per 100 lb.

ROLLER LEVELING—.....Add \$0.10 per 100 lb.

## STRAPPING BOXES—

Double strapping.....	Add \$0.10 per pkg.
(Boxes strapped all around)	

## DIRECT SHIPMENT—

On all shipments to jobbers' customers in lots of less than 5000 lb., Add \$0.10 per 100 lb.

LOADING ON WOODEN PLATFORMS—Add \$0.05 per 100 lb.

## WIDTH AND LENGTH EXTRAS—

GAGE	WIDTH	LENGTHS
Nos. 15 to 31	14 in. to 30 in. None	14 in. to 60 in. None
Over 30 in. to 32 in.	10c.	Over 60 in. to 72 in. 10c.
Under 14 in. to 10 in.	15c.	Over 72 in. to 84 in. 20c.
Under 10 in. to 6 in.	25c.	Under 14 in. to 10 in. 15c.
Under 6 in. to 4 in.	35c.	

## Porcelain Enameling Sheets

### Porcelain Enameling Sheets—Gage Differentials

16 Ga. and Heavier

Gage No.	Per 100 lb.
10.....	BASE
11 and 12.....	Add \$0.05
13.....	Add 0.10
14.....	Add 0.15
15.....	Add 0.20
16.....	Add 0.25
17 Ga. and Lighter	
17.....	Deduct 0.15
18.....	Deduct 0.10
19.....	Deduct 0.05
20.....	BASE
21.....	Add 0.05
22.....	Add 0.10
23.....	Add 0.15
24.....	Add 0.20
25.....	Add 0.25
26.....	Add 0.30

#### SIZE EXTRAS, CENTS PER 100 LB.

Gage	WIDTH, IN.												Under
	Over												
	32	36	40	44	48	52	56	60	64	68	72		
	to	to	to	to	to	to	to	to	to	to	to	to	
16 and heavier ..	36	40	44	48	52	56	60	64	68	72	78	12	
17 and 18 .....	..	..	..	..	15	15	20	25	35	45	..	10	
19 and 20 .....	..	..	..	..	20	20	20	30	40	50	60	10	
21 .....	..	..	..	..	20	20	30	40	50	60	70	10	
22 .....	..	..	10	20	30	40	50	60	..	..	..	15	
23 .....	..	15	30	45	60	75	1.00	..	..	..	..	15	
23 and 24 .....	..	20	40	60	80	..	..	..	..	..	..	15	
25 and 27 .....	..	30	60	90	..	..	..	..	..	..	..	20	
28 .....	20	40	80	1.20	..	..	..	..	..	..	..	20	
29 .....	30	60	90	..	..	..	..	..	..	..	..	20	
30 .....	40	80	..	..	..	..	..	..	..	..	..	20	

Gage	LENGTH, IN.								Under
	Over								
	96	108	120	132	144	30	18	10	
	to	to	to	to	to	to	to	to	
	108	120	132	144	156	18	10	6	
16 and heavier . . . . .	..	..	..	..	10	15	25	45	
17 and 18 . . . . .	..	..	10	10	15	15	25	45	
19 and 20 . . . . .	..	10	10	15	20	15	25	45	
21 and 22 . . . . .	10	15	20	25	30	15	25	45	
23 and 27 . . . . .	15	20	25	30	35	15	25	45	
28 and 30 . . . . .	20	25	30	35	40	15	25	45	

#### Miscellaneous Extras

Drawing quality, quantity extras, crating extras, shearing circles and other miscellaneous extras applicable to this grade may be found among miscellaneous extras under the hot rolled sheet products.

#### Hot-Rolled Strip Steel

Hot-rolled strip steel is quoted at 1.65c. a lb., base Pittsburgh, and at 1.75c. a lb., base Chicago. Subject to extras per standard classification of extras on hot-rolled strip steel.

#### EXTRA FOR CUTTING TO SPECIFIED LENGTH PER 100 LB.

	Under 2000 Lb.	Under 1500 Lb.	Under 1000 Lb.	Under 500 Lb.
Cutting to length of 60 in. and over...	No Charge	10c.	20c.	40c.
Cutting to lengths over 48 and under 60 in.	5c.	20c.	30c.	50c.
Cutting to lengths over 24 to 48 in., inc.	15c.	25c.	35c.	55c.
Cutting to lengths over 12 to 24 in., inc.	30c.	40c.	50c.	70c.
Extra for cutting to specified lengths 12 in. and less will be furnished on application.				

#### QUALITY EXTRAS PER 100 LB.

Tack plate quality .....	20c.
Tight cooperage hoop .....	10c.
Locomotive firebox steel .....	50c.
Ordinary firebox steel .....	20c.
Flange steel, boiler quality .....	15c.
Hot pressing steel (not flange steel for boilers) .....	10c.
Forging quality (when specified) .....	25c.
Hull material subject to U.S. Navy Dept., specification for medium or soft steel .....	25c.

#### SKETCHES AND CIRCLES PER 100 LB.

(Not requiring re-entrant cutting)

Regular sketches (with not more than four straight edges) including straight taper plates ..... 20c.  
 Irregular sketches (with more than four straight edges) ..... 50c.  
 Sketches furnished to a radius ..... 50c.  
 Circles: Extras quoted on application.  
 Semi-circles: Extras quoted on application.  
 Extras for sketches requiring re-entrant cutting quoted on application.

When sketches or circles are required to be flame cut, the above extras will apply in addition to regular flame cutting extras.

#### QUANTITY DIFFERENTIALS

All specifications for less than 6000 lb. of a size will be subject to the following "lump sum" extras for handling and assembling. These extras to be added to the net price of the material and to be determined by the total weight of a size ordered, for shipment at one time.

Less than 6000 lb. to 4000 lb.....	\$2 lump sum
Less than 4000 lb. to 2000 lb.....	4 lump sum
Less than 2000 lb. to 1000 lb.....	8 lump sum
Less than 1000 lb.....	12 lump sum

#### DRAWING EXTRAS PER 100 LB.

For all items of hot rolled strip on which the supplier must stand for a drawing hazard of breakage or of rejection for surface disturbance in accordance with trade customs, the following drawing extras to be charged:

12 ga. and heavier.....	15c.
13 ga. and heavier.....	25c.

The above also applies wherever the customer specifies hot rolled strip to be normalized or box annealed.

Oil pans (or crank cases) are a type of product requiring the drawing extra.

The specifications requiring guaranteed case carburizing qualities to meet McQuaide-Ehn tests, carry an extra of 60c. per 100 lb.

#### SPECIAL NOTES

Unless forging quality is specified hot rolled strip shall be furnished to ladle analysis only.

No allowance for uncropped coils.

#### EXTRAS FOR CHEMICAL SPECIFICATIONS PER 100 LB. CARBON:

The mean of the range agreed upon between the purchaser and the manufacturer shall determine the extra.

	0.076 in. and Hvr.	0.075 in. and Ltr.
Over 0.25 to 0.40 per cent	5c.	10c.
Over 0.40 to 0.60 per cent	10c.	25c.
Over 0.60 to 1.00 per cent	15c.	40c.
Over 1.00 per cent.....	On application	On application

#### MANGANESE:

The mean of the range agreed upon between the purchaser and the manufacturer shall determine the extra.

0.30 to 0.90 per cent.....	No extra
0.91 to 1.15 per cent.....	10c.
1.16 to 1.35 per cent.....	20c.
1.36 to 1.50 per cent.....	25c.

NOTE: When the mean of the range agreed upon is above 1.15, the extras shall apply only to steel with maximum carbon specified 0.20 or higher. Prices for exceptions made by this note will be quoted on application.

#### SILICON:

The mean of the range agreed upon between the purchaser and the manufacturer shall determine the extra.

Minimum not specified....	No extra
Up to 0.25 per cent, inc....	10c.
0.26 to 0.50 per cent, inc....	20c.

#### PHOSPHORUS:

Minimum not specified....	No extra
Up to 0.08 per cent, minimum, inc. ....	5c.

NOTE: Phosphorus extra applies to open-hearth steel only.

#### SULPHUR:

Minimum not specified .....	No extra
Up to 0.10 per cent, minimum, inc. ....	10c.
0.11 to 0.20 per cent, minimum, inc. ....	17½c.
0.21 to 0.30 per cent, minimum, inc. ....	25c.

#### COPPER:

Copper bearing .....	15c.
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### Hot-Rolled Strip Steel

#### STANDARD EXTRAS—SUBJECT TO CHANGE WITHOUT NOTICE

BASE PRICE: Per 100 lb., 0.25% carbon and under, in coils or cut lengths 5 ft. and over, including short ends.

#### EXTRAS TO BE ADDED TO BASE PRICE:

Gage	$\frac{3}{16}$ in.	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Decimal, in.	0.249	0.190	0.179	0.161	0.145	0.131	0.117	0.104	0.089	0.075	0.067	0.060	0.053	0.046	0.040	0.034	0.031	0.027
to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to	to
Width, in.	0.191	0.180	0.162	0.146	0.132	0.118	0.105	0.090	0.076	0.068	0.061	0.054	0.047	0.041	0.035	0.032	0.028	0.025
$\frac{3}{16}$	1.45	1.45	1.45	1.50	1.60	1.60	1.70	1.80	2.00	2.20	2.40	2.60	2.85	3.20	3.60	4.00	4.40	4.75
$\frac{7}{16}$	1.25	1.25	1.25	1.25	1.35	1.40	1.50	1.60	1.70	1.85	2.05	2.25	2.45	2.75	3.10	3.45	3.85	4.25
$\frac{1}{2}$	1.05	1.05	1.05	1.05	1.10	1.10	1.20	1.25	1.35	1.45	1.55	1.75	1.95	2.15	2.35	2.75	3.25	3.75
$\frac{9}{16}$	0.85	0.85	0.85	0.85	0.90	0.90	1.00	1.05	1.10	1.15	1.25	1.35	1.55	1.75	1.95	2.35	2.75	3.25
$\frac{5}{8}$ to $\frac{1}{2}$	0.70	0.70	0.70	0.70	0.75	0.75	0.85	0.90	0.95	1.00	1.05	1.15	1.25	1.45	1.65	1.95	2.35	2.75
$\frac{3}{4}$ to $\frac{1}{2}$	0.55	0.55	0.55	0.55	0.60	0.60	0.70	0.75	0.85	0.85	0.90	0.95	1.05	1.15	1.35	1.55	1.85	2.25
$\frac{3}{4}$ to $\frac{1}{2}$	0.45	0.45	0.45	0.45	0.50	0.50	0.60	0.65	0.70	0.75	0.80	0.85	0.90	0.95	1.05	1.25	1.55	1.85
1 to $\frac{1}{2}$	0.35	0.35	0.35	0.35	0.40	0.40	0.50	0.55	0.60	0.65	0.65	0.75	0.85	0.95	1.15	1.45	1.65	1.65
$\frac{1}{2}$ to 2	0.30	0.30	0.30	0.30	0.35	0.35	0.40	0.45	0.45	0.50	0.55	0.60	0.70	0.90	1.15	1.35	1.65	1.65
$\frac{1}{2}$ to $\frac{1}{2}$	0.25	0.25	0.25	0.25	0.30	0.30	0.35	0.40	0.40	0.45	0.55	0.70	0.85	1.05	1.20	1.40	1.70	1.70
$\frac{1}{2}$ to 3	0.20	0.20	0.20	0.20	0.25	0.25	0.30	0.35	0.35	0.40	0.45	0.55	0.70	0.90	1.15	1.25	1.45	1.70
$\frac{1}{2}$ to $\frac{1}{2}$	0.15	0.15	0.15	0.15	0.20	0.20	0.25	0.30	0.35	0.35	0.45	0.60	0.75	0.95	1.20	1.30	1.50	1.75
$\frac{1}{2}$ to 4	0.15	0.15	0.15	0.15	0.20	0.20	0.25	0.30	0.35	0.40	0.50	0.65	0.85	1.05	1.25	1.45	1.65	1.75
$\frac{1}{2}$ to 5	0.10	0.10	0.10	0.10	0.15	0.15	0.20	0.25	0.30	0.40	0.55	0.75	0.95	1.15	1.35	1.55	1.75	1.75
$\frac{1}{2}$ to 6	0.10	0.10	0.10	0.10	0.15	0.15	0.20	0.25	0.30	0.40	0.55	0.75	0.95	1.20	1.40	1.60	1.80	1.80
$\frac{1}{2}$ to 8	0.05	0.05	0.05	0.05	0.10	0.10	0.15	0.20	0.25	0.35	0.45	0.65	0.85	1.05	1.25	1.45	1.65	1.85
$\frac{1}{2}$ to 10	0.05	0.05	0.05	0.05	0.10	0.10	0.15	0.20	0.25	0.35	0.45	0.65	0.85	1.05	1.25	1.45	1.65	1.85
$\frac{1}{2}$ to 12	0.05	0.05	0.05	0.05	0.10	0.10	0.15	0.20	0.25	0.30	0.35	0.45	0.65	0.85	1.05	1.25	1.45	1.65
$\frac{1}{2}$ to 15	base	base	base	base	0.05	0.05	0.10	0.10	0.15	0.15	0.25	0.30	0.45	0.65	0.85	1.05	1.25	1.45
$\frac{1}{2}$ to 20	base	base	base	base	0.05	0.05	0.10	0.10	0.15	0.15	0.20	0.25	0.40	0.55	0.70	0.90	1.10	1.30
$\frac{1}{2}$ to $\frac{1}{2}$	base	base	base	base	0.05	0.05	0.10	0.10	0.15	0.15	0.20	0.25	0.40	0.55	0.70	0.90	1.10	1.30

#### PICKLING—

Under $\frac{1}{2}$ in.	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.70	0.70	0.70	0.70	0.90	0.90	0.90	0.90	1.25	1.25	1.25
$\frac{1}{2}$ to 5 in.	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.55	0.55	0.55	0.55	0.70	0.70	0.70	0.70	1.05	1.05	1.05
$\frac{1}{2}$ to $\frac{1}{2}$ in.	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.35	0.35	0.35	0.35	0.45	0.45	0.45	0.45	0.75	0.75	0.75

#### SPLITTING—

$\frac{1}{2}$ in. and wider	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.40	0.40	0.40	0.55	0.55	0.55	0.75	0.75	0.75
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### Cold-Rolled Strip Steel

Cold-rolled strip steel is quoted at 2.25c. a lb., base Pittsburgh or Cleveland, and at 2.45c. a lb., base Worcester, Mass. Subject to extras per standard classification of extras on cold-rolled strip.

#### EXTRAS FOR LIGHTER THAN 0.010 IN. (ANY TEMPER)

No. 1—Widths 1 in. and wider	\$1.00 per 100 lb.
$\frac{3}{8}$ in. to less than 1 in.	2.00 per 100 lb.
Narrower than $\frac{3}{8}$ in.	3.00 per 100 lb.

No. 2—Base

No. 3—Base

No. 4—Base

No. 5—Widths  $\frac{1}{2}$  in. and wider..... 0.40 per 100 lb.

$\frac{3}{8}$  in. to less than  $\frac{1}{2}$  in..... 0.80 per 100 lb.

Narrower than  $\frac{3}{8}$  in. .... 1.20 per 100 lb.

No. 6—All widths ..... 0.50 per 100 lb.

#### EXTRAS FOR FINISH

No. 2 Finish—Base

No. 3—Finish—25c. per 100 lb.

### Cold-Rolled Strip

#### STANDARD EXTRAS—SUBJECT TO CHANGE WITHOUT NOTICE

BASE PRICE—per one hundred pounds—for over 6 in. up to  $23\frac{1}{2}$  in. inclusive x 0.161 and thicker, in Coils, HARD TEMPER, 0.25 Carbon and under

#### EXTRAS TO BE ADDED TO BASE PRICE:

##### COILS

THICKNESS (Inches)	Under $\frac{1}{2}$ in. to $\frac{3}{8}$ in. Incl.	Under 1 in. to $\frac{1}{2}$ in. Incl.	Under $1\frac{1}{2}$ in. to 1 in. Incl.	Under 3 in. to $1\frac{1}{2}$ in. Incl.	3 in. to 6 in. Incl.	Over 6 in. to 9 in. Incl.	Over 9 in. to 12 in. Incl.	Over 12 in. to $23\frac{1}{2}$ in. Incl.
	Hard Soft	Hard Soft	Hard Soft	Hard Soft	Hard Soft	Hard Soft	Hard Soft	Hard Soft
0.161 & heavier	\$2.00 \$2.45	\$1.35 \$1.80	\$0.85 \$1.30	\$0.65 \$0.95	\$0.25 \$0.70	Base \$0.45	Base \$0.45	Base \$0.45
0.160 to 0.100	1.85 2.30	1.20 1.65	0.75 1.20	0.50 0.95	0.25 0.70	\$0.10 0.55	\$0.10 0.55	\$0.10 0.55
0.099 to 0.069	1.45 1.90	1.05 1.50	0.70 1.15	0.50 0.95	0.40 0.85	0.20 0.65	0.20 0.65	0.20 0.65
0.068 to 0.050	1.55 2.00	1.15 1.60	0.80 1.25	0.55 1.00	0.50 0.95	0.30 0.75	0.30 0.75	0.30 0.75
0.049 to 0.040	1.70 2.25	1.30 1.85	0.95 1.50	0.70 1.25	0.65 1.20	0.45 1.00	0.45 1.00	0.45 1.00
0.039 to 0.035	1.70 2.25	1.30 1.85	0.95 1.50	0.70 1.25	0.65 1.20	0.60 1.15	0.60 1.15	0.60 1.15
0.034 to 0.032	2.10 2.80	1.60 2.30	1.35 2.05	0.90 1.60	0.85 1.55	0.75 1.45	0.75 1.45	0.75 1.45
0.031 to 0.029	2.30 3.00	1.80 2.50	1.55 2.25	1.10 1.80	1.05 1.75	0.80 1.50	0.90 1.60	0.95 1.65
0.028 to 0.026	2.40 3.10	1.90 2.60	1.65 2.35	1.20 1.90	1.15 1.85	0.90 1.60	1.10 1.80	1.15 1.85
0.025 to 0.023	2.60 3.30	2.10 2.80	1.85 2.55	1.40 2.10	1.35 2.05	1.25 1.95	1.50 2.20	1.60 2.30
0.022 to 0.020	2.75 3.45	2.25 2.95	2.00 2.70	1.55 2.25	1.50 2.20	1.50 2.20	1.85 2.55	2.45 2.90
0.019 to 0.017	3.60 3.60	3.20 3.20	2.95 2.95	2.50 2.50	2.35 2.35	2.60 2.60	2.85 2.85	3.05 3.45
0.016 to 0.015	4.15 4.15	3.75 3.75	3.50 3.50	3.05 3.05	2.90 2.90	3.15 3.15	3.50 3.50	3.75 3.75
0.014 to 0.013	4.80 4.80	4.40 4.40	4.15 4.15	3.80 3.80	3.80 3.80	4.20 4.20	4.40 4.40	4.45 4.45
0.012	5.45 5.45	5.05 5.05	4.80 4.80	4.45 4.45	4.25 4.25	4.45 4.45	4.80 4.80	5.05 5.05
0.011	5.70 5.70	5.30 5.30	5.05 5.05	4.70 4.70	4.50 4.50	4.70 4.70	5.05 5.05	5.30 5.30
0.010	6.15 6.15	5.75 5.75	5.50 5.50	5.15 5.15	4.95 4.95	5.15 5.15	5.50 5.50	5.75 5.75

Extras for Soft apply to all Tempers, except Full Hard.

Coils lighter than 0.010 in.—See Special List of Extras.

## Cold-Rolled Strip Steel

## CUT LENGTHS 24 IN. AND LONGER

THICKNESS (Inches)	Under ½ in. to ⅜ in. Incl.		Under 1 in. to ½ in. Incl.		Under 1½ in. to 1 in. Incl.		Under 3 in. to 1½ in. Incl.		3 in. to 6 in. Incl.		Over 6 in. to 9 in. Incl.		Over 9 in. to 12 in. Incl.		Over 12 in. to 23½ in. Incl.	
	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft	Hard	Soft
0.161 & heavier	\$3.50	\$3.95	\$1.85	\$2.30	\$1.20	\$1.65	\$0.85	\$1.30	\$0.50	\$0.95	\$0.25	\$0.70	\$0.25	\$0.70	\$0.25	\$0.70
0.160 to 0.100	3.35	3.80	1.70	2.15	1.10	1.55	0.85	1.30	0.50	0.95	0.35	0.80	0.35	0.80	0.35	0.80
0.099 to 0.069	3.45	3.90	2.05	2.50	1.25	1.70	1.05	1.50	0.85	1.30	0.65	1.10	0.65	1.10	0.65	1.10
0.068 to 0.050	3.55	4.00	2.15	2.60	1.35	1.80	1.10	1.55	0.95	1.40	0.75	1.20	0.75	1.20	0.75	1.20
0.049 to 0.040	3.70	4.25	2.30	2.85	1.50	2.05	1.25	1.80	1.10	1.65	0.90	1.45	0.90	1.45	0.90	1.45
0.039 to 0.035	3.70	4.25	2.30	2.85	1.50	2.05	1.25	1.80	1.10	1.65	1.05	1.60	1.05	1.60	1.05	1.60
0.034 to 0.032	5.10	5.80	3.10	3.80	2.25	2.95	1.80	2.50	1.55	2.25	1.45	2.15	1.45	2.15	1.45	2.15
0.031 to 0.029	5.55	6.25	3.80	4.50	2.80	3.50	2.35	3.05	2.00	2.70	1.75	2.45	1.85	2.55	1.90	2.60
0.028 to 0.026	5.90	6.60	3.90	4.60	2.90	3.60	2.45	3.15	2.10	2.80	1.85	2.55	2.05	2.75		
0.025 to 0.023	6.60	7.30	4.60	5.30	3.45	4.15	3.00	3.70	2.55	3.25	2.45	3.15	2.70	3.40		
0.022 to 0.020	7.25	7.95	4.75	5.45	3.60	4.30	3.15	3.85	2.70	3.40	2.70	3.40	3.05	3.75		
0.019 to 0.017	9.60	9.60	7.20	7.20	6.25	6.25	5.80	5.80	4.90	4.90	5.15	5.15	5.40	5.40		
0.016 to 0.015	11.15	11.15	7.75	7.75	6.80	6.80	6.35	6.35	5.45	5.45	5.70	5.70				
0.014 to 0.013	12.80	12.80	9.65	9.65	8.65	8.65	8.30	8.30	7.30	7.30	7.70	7.70				

Extras for Soft apply to all Tempers, except Full Hard.

Extras for lengths under 24 in. on application.

NOTE: The charge for cutting to length does not relieve buyer from scrap loss, and short pieces left from cutting will be shipped and invoiced at price of long lengths. If lengths over 36 in. are ordered and no short pieces taken, add 10 per cent to net price.

## COPPER

0.25 Copper and under.....	\$0.15 per 100 lb.
Over 0.25 Copper.....	0.40 per 100 lb.

## DESCRIPTION OF TEMPERS

Steel of 0.25 Carbon and under, up to and including 0.89 B Scale Rockwell to be sold at soft price, and 0.90 B Scale Rockwell and over to be sold at hard price.

## DESCRIPTION OF EDGES

- No. 1—A perfect round or square smooth edge.  
 No. 2—Natural round edge.  
 No. 3—Square, produced by slitting, not filed.  
 No. 4—Round edge rolled.  
 No. 5—Square, produced by rolling or filing after slitting.  
 No. 6—Square edge, rolled.

## DESCRIPTION OF FINISHES

- No. 2—Regular bright finish, suitable for ordinary purposes.  
 No. 3—Best bright finish.

## NOTES

Extras for width and gage tolerances closer than standard, on application.

All cold-rolled material sold in coils, in all gages and in widths up to and including 23½ in., to be sold on cold-rolled strip base and card of extras.

The specifications requiring guaranteed case carburizing qualities to meet McQuaide-Ehn tests carry an extra of 90c. per 100 lb. It is understood that this is 50 per cent higher than that carried by the hot-rolled strip manufacturers.

## EXTRAS FOR CARBON

Thickness	Over		
	0.25 to 0.50 Carbon Incl.	0.51 to 0.80 Carbon Incl.	0.81 to 1.00 Carbon Incl.
	Add per 100 lb.		
0.100 in. & thicker . . . .	\$0.90	\$2.65	\$5.00
0.050 in. to 0.099 in. . . .	1.10	2.85	5.50
0.035 in. to 0.049 in. . . .	1.35	3.10	6.00
0.031 in. to 0.034 in. . . .	1.50	3.25	6.50
0.025 in. to 0.030 in. . . .	1.70	3.45	7.00
0.020 in. to 0.024 in. . . .	2.00	3.75	7.50
0.017 in. to 0.019 in. . . .	3.00	4.75	8.50
0.015 in. to 0.016 in. . . .	3.55	5.30	10.00
0.013 in. to 0.014 in. . . .	4.20	5.95	11.50
0.12 in. . . . .	4.85	6.60	13.00
0.011 in. . . . .	5.10	6.85	14.50
0.010 in. . . . .	5.85	7.30	16.00

## EXTRAS FOR LIGHTER THAN 0.010 IN. (ANY TEMPER)

Thickness	Addition to 0.010 Extra	Thickness	Addition to 0.010 Extra
0.009 in.	\$0.50	0.004 in.	\$4.00
0.008 in.	1.00	0.0035 in.	5.00
0.007 in.	1.50	0.003 in.	6.00
0.006 in.	2.50	0.0025 in.	10.00
0.005 in.	3.50	0.002 in.	14.00
0.0045 in.	4.00		

ADDITIONAL EXTRAS TO BE CHARGED FOR SHEARING  
OF NARROWER WIDTHS IN THICKNESS UNDER 0.010

Thickness	Under ½ in. to ¼ in. Incl.	Under 1 in. to ½ in. Incl.	Under 1½ in. to 1 in. Incl.
0.002 in. to 0.00275 in. .	\$8.00	\$6.00	\$4.00
0.003 in. to 0.0035 in. .	5.50	4.50	3.50
0.004 in. to 0.0045 in. .	4.50	3.50	3.00
0.005 in. ....	3.00	2.00	1.50
0.006 in. ....	2.50	1.50	1.25
0.007 in. ....	2.00	1.25	1.00
0.008 in. ....	1.50	1.10	0.85
0.009 in. ....	1.25	1.00	0.75

(Intermediate thicknesses take next lighter gage extra.)

## BOXING OR WRAPPING EXTRA

Material boxed, barrelled, crated or wrapped—25c. per 100 lb.; minimum charge, \$1.00.

## EXTRAS FOR QUANTITY

To apply on any single item of one width, thickness, finish, temper and edge for shipment at one time.

2000 lb. to 5999 lb.....	\$0.25 per 100 lb.
1000 lb. to 1999 lb.....	0.65 per 100 lb.
500 lb. to 999 lb.....	1.25 per 100 lb.
300 lb. to 499 lb.....	2.25 per 100 lb.
200 lb. to 299 lb.....	3.25 per 100 lb.
100 lb. to 199 lb.....	5.25 per 100 lb.

Orders for less than 100 lb. of a size will be accepted only at full valuation of 100 lb.

## SPECIAL NOTICES

No cold-rolled strip seconds will be shipped with prime material.

Price for cold-rolled strip seconds to be 50c. per 100 lb. less than the prime price for the same gage, size and temper.

Quoting No. 2 and No. 3 tempers on the hard extras is an unfair practice and should be eliminated. Material for flat work only is to be on the basis of No. 1 temper. Butt stock 0.050 in. and heavier to be sold on cold-rolled strip base plus the hard extra to butt manufacturers only.

Discount for uncropped coils to be eliminated.

## Stainless Steel Bars, Plates, Sheets and Strip

### Base Prices, Cents per Pound

(Extras, as listed below this base price table, to be added for special composition, finish, size, etc.)

	Nos. 1 and 2			Strip	
	Hot Rolled Only	Finish		H.R.	C.R.
	Bars	Plates	Sheets		
Max. 0.08% C, 18% Cr, 8% Ni.....	24c.	28c.	35c.	24½c.	32c.
Over 0.08 to 0.12% C, 19% Cr, 9% Ni....	24c.	28c.	35c.	24½c.	32c.
Over 0.08% to 0.20% C, 18% Cr, 8% Ni	23c.	26c.	33c.	23½c.	30c.
Over 0.08% to 0.20% C, 18% Cr, 8% Ni, 2% to 4% Mo.....	38c.	41c.	45c.	38c.	45c.
18% Cr, 8% Ni, plus Ti equal to 4 times C content .....	27c.	32c.	39c.	27½c.	36c.
<b>FREE MACHINING QUALITY</b>					
Over 0.08% to 0.20% C, 18% Cr, 8% Ni, S and or Se Min. 0.15% .....	25c.	28c.	35c.	25½c.	32c.
Over 0.08% to 0.20% C, 20% Cr, 10% Ni	26c.	30c.	37c.	26½c.	34c.
25% Cr, 20% Ni....	48c.	51c.	52c.	48c.	55c.
8% Cr, 22% Ni, 1.00 to 1.50% Cu.....	25c.	29c.	36c.	25½c.	33c.
18% Cr, 25% Ni....	48c.	51c.	52c.	48c.	55c.
Carbon Max. 0.20% 25% Cr, 12% Ni..	35c.	39c.	46c.	35½c.	46c.
C Max. 0.12%, Cr 12% to 15%, S and or Se Min. 0.15%....	17c.	20c.	25c.	17c.	22½c.
<b>TURBINE QUALITY</b>					
C Max. 0.12%, Cr 11½ to 13% .....	20c.	23c.	28c.	20c.	25½c.
<b>STAINLESS GRADE A</b>					
C over 0.12%, Cr 12 to 15% .....	28c.	31c.	36c.	28c.	37c.
<b>STAINLESS GRADE B</b>					
C over 0.12%, Cr over 15 to 18% .....	26c.	29c.	34c.	26c.	35c.
Cr over 18 to 23% ..	21c.	24c.	31c.	21c.	27c.
<b>STAINLESS GRADE C1</b>					
C Max. 0.12%, Cr 12 to 15% .....	17c.	20c.	25c.	17c.	22½c.
<b>STAINLESS GRADE C2</b>					
C Max. 0.12%, Cr over 15 to 18% .....	18½c.	21½c.	28c.	18½c.	24c.
<b>STAINLESS GRADE C4</b>					
C Max. 0.25%, Cr 23 to 30% .....	26c.	29c.	35c.	26c.	35c.

## 4 TO 6 PER CENT CHROME

0.25 to 0.21% C.....	6½c.	9½c.	13½c.	9½c.	13½c.
0.20 to 0.16% C.....	7½c.	10½c.	14½c.	10½c.	14½c.
0.15 to 11% C.....	8½c.	11½c.	15½c.	11½c.	15½c.
0.10% Max. C.....	9c.	12c.	16c.	12c.	16c.

## DIFFERENTIALS FOR QUANTITY

(Do not apply to tubing or to 4 to 6 per cent Chrome)

<b>Over 40,000 Base</b>	
Under 40,000 to 20,000 lb.....	add 1c.
Under 20,000 to 10,000 lb.....	add 1½c.
Under 10,000 to 5,000 lb.....	add 2c.
Under 5,000 to 2,000 lb.....	add 3c.
Under 2,000 to 1,000 lb.....	add 4c.
Under 1,000 to 500 lb.....	add 5c.
Under 500 to 300 lb.....	add 7c.
Under 300 to 200 lb.....	add 9c.
Under 200 to 100 lb.....	add 11c.
Under 100 lb.....	add 12c.

(Following quantity differentials apply to 4 to 6 per cent Chrome)

<b>Over 40,000 Base</b>	
Under 40,000 to 20,000 lb.....	add ½c.
Under 20,000 to 10,000 lb.....	add ¾c.
Under 10,000 to 5,000 lb.....	add 1c.
Under 5,000 to 2,000 lb.....	add 1½c.
Under 2,000 to 1,000 lb.....	add 2c.
Under 1,000 to 500 lb.....	add 2½c.
Under 500 to 300 lb.....	add 3½c.
Under 300 to 200 lb.....	add 4½c.
Under 200 to 100 lb.....	add 5½c.
Under 100 lb.....	add 6c.

Above quantity differentials are applicable only to individual items of a size and gage ordered at one time for shipment at one time.

## EXTRAS FOR ALLOY ADDITIONS

0.40 to 0.60% Mo.....	Add 1c. per lb.
0.75 to 1.25% Ti.....	Add 3c. per lb.
1.00 to 2.00% Si.....	Add 1c. per lb.

## EXTRAS FOR SIZE, SHAPE, ETC.

Billets, round or round-cornered square, for forging 4 in. and larger, and round-cornered flat at 16 sq. in. cross sectional area and larger, 10% less than the bar base.

Billets smaller than 4 in. round or square, and flats of less than 16 sq. in. cross-sectional area, take the finished bar classification.

Billets, annealed for cold cutting or cold shearing, take an extra 1c. per pound; if rough turned add 1½c. per lb. One-half of stainless quantity extras also apply.

When cold cut to exact length, add regular extras for wastage.

## SEAMLESS TUBE BILLETS

Round billets 3 in. and larger, for piercing, for the manufacture of seamless tubes, hot-rolled bar base less 10%. With no extra for size. When rough turned add 1½c. per pound, cutting to length or weight ¼c. per pound. One-half of stainless quantity extras also apply.

## Federation Driving to Unionize Auto Trade

**C**LAIMING that over 100 fellow workers have been discharged because of union activities employees of the St. Louis assembly plant of the Chevrolet Motor Co. have asked President Roosevelt to refuse permission to the company to use the Blue Eagle insignia.

Denying these charges, M. E. Coyle, vice-president of the Chevrolet Co., declared that some employees at St. Louis have been laid off because of lower production schedules this month, but none was dismissed because of union affiliations. He stated however, that "The St. Louis plant is 60 per cent organized and perhaps it

was inevitable that some trouble should follow." This incident brings into the foreground the fact heretofore unknown that the American Federation of Labor has made considerable progress in its membership drive in the automobile industry. A mass meeting was held recently in Pontiac by the Federation of Automotive Workers of Pontiac which was organized two weeks before. Meetings are being scheduled constantly throughout the Detroit district in an effort to enlist all automotive workers in the union cause.

The Chevrolet Co. has just announced a plan for an association of its employees and a works council in each of 13 plants. The purpose is to promote cooperation between employees and the management on the

following subjects: Hours of labor, wage rates, working conditions, safety, health and efficiency and economy of operations. Membership is voluntary and is open to employees 21 years of age who are U. S. citizens or have first papers, and who have been employed at least 90 days. By secret ballot on company time, and themselves handling the election machinery, members will elect representatives to a works council which will meet privately with company officials present only when requested. Matters affecting all the company plants will be referred to a general works council committee consisting of the chairmen of all the works councils meeting in Detroit. A similar association is being formed by the Pontiac Motor Co., another General Motors subsidiary.

## Pig Iron Daily Output Up 2.2 Per Cent in August

**A**UGUST production of coke pig iron totaled 1,833,394 gross tons against 1,792,452 tons in July. The August daily rate, at 59,142 tons, showed a gain of 2.2 per cent over the July average of 57,821 tons a day.

There were 98 furnaces in blast on Sept. 1, making iron at the rate of 56,070 tons daily, compared with 106 on Aug. 1, with a daily operating rate of 61,435 tons. Five furnaces were blown in and 13 blown out or banked. The Steel Corporation showed a loss of nine furnaces, independent steel companies put two in and two out, and merchant companies blew three in and two out.

Among the furnaces blown out or banked are the following: Two Carrie, one Duquesne, one Ohio furnace of the Carnegie Steel Co.; two Haselton furnaces, Republic Steel Corp.; one Lorain furnace of the National Tube Co.; one South Chicago and one Gary furnace, Illinois Steel Co.; two Ensley units, Tennessee Coal, Iron & Railroad Co.; one Woodward furnace, Woodward Iron Co., and the Rockdale furnace of the Tennessee Products Corp.

Furnaces blown in include: one Sparrows Point furnace, Bethlehem Steel Co.; one Haselton and one Pioneer furnace of the Republic Steel Corp.; one Toledo furnace, Interlake Iron Corp., and one Woodward furnace of the Woodward Iron Co.

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons)		September 1		August 1	
	August (31 Days)	July (31 Days)	Number in Blast	Operating Rate, Tons a Day	Number in Blast	Operating Rate, Tons a Day
<b>New York:</b>						
Buffalo .....	87,174	77,405	6	2,810	6	2,765
Other New York and Mass..	18,068	4,995	2	585	2	445
<b>Pennsylvania:</b>						
Lehigh Valley .....	22,203	28,674	2	715	2	925
Schuylkill Valley .....	12,757	14,680	1	410	1	475
Susquehanna and Lebanon Valleys .....	.....	.....	0	....	0	....
Ferromanganese .....	2,701	2,888	1	85	1	95
Pittsburgh District .....	422,360	419,762	19	12,520	23	14,275
Ferro. and Spiegel .....	10,755	3,598	2	345	1	115
Shenango Valley .....	50,638	49,937	3	1,635	3	1,610
Western Pennsylvania .....	52,343	51,748	3	1,690	3	1,670
Ferro. and Spiegel .....	6,226	12,175	1	200	1	395
Maryland .....	92,715	73,952	4	2,990	3	2,385
Wheeling District .....	120,476	126,568	6	3,885	6	4,085
<b>Ohio:</b>						
Mahoning Valley .....	229,825	210,713	10	6,480	12	7,925
Central and Northern .....	211,595	193,062	11	6,565	11	6,880
Southern .....	32,561	32,048	2	1,050	2	1,035
Illinois and Indiana .....	279,515	318,634	12	8,345	14	10,280
Mich., Wis. and Minn. ....	30,943	29,935	2	1,000	2	965
Colo., Mo. and Utah .....	17,758	4,283	2	575	2	525
<b>The South:</b>						
Virginia .....	.....	.....	0	....	0	....
Kentucky .....	12,544	12,939	1	405	1	415
Alabama .....	120,237	122,308	8	3,780	9	4,100
Ferromanganese .....	.....	.....	0	....	0	....
Tennessee .....	.....	2,148	0	....	1	70
<b>Total .....</b>	<b>1,833,394</b>	<b>1,792,452</b>	<b>98</b>	<b>56,070</b>	<b>106</b>	<b>61,435</b>

Merchant Iron Made, Daily Rate

1933	Tons	1932	Tons
January .....	2,602	January .....	6,256
February .....	2,863	February .....	7,251
March .....	2,412	March .....	7,157
April .....	1,908	April .....	5,287
May .....	3,129	May .....	4,658
June .....	4,088	June .....	6,090
July .....	6,783	July .....	3,323
August .....	7,756	August .....	3,070
September .....	.....	September .....	3,213
October .....	.....	October .....	4,286
November .....	.....	November .....	4,435
December .....	.....	December .....	3,674

Production of Coke Pig Iron and Ferromanganese

	Gross Tons Pig Iron*		Ferromanganese†	
	1933	1932	1933	1932
January .....	568,785	972,784	8,810	11,250
February .....	554,330	964,280	8,591	4,010
March .....	542,011	967,235	4,783	4,900
April .....	623,618	852,897	5,857	481
May .....	887,252	783,554	5,948	5,219
June .....	1,265,007	628,064	13,074	7,702
½ year .....	4,441,003	5,168,814	47,063	33,561
July .....	1,792,452	572,296	18,661	2,399
August .....	1,833,394	530,576	16,953	3,414
September .....	.....	592,589	.....	2,212
October .....	.....	644,808	.....	2,362
November .....	.....	631,280	.....	5,746
December .....	.....	546,080	.....	7,887
Year .....	.....	8,686,443	.....	57,342

\*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.  
†Included in pig iron figures.

Daily Average Production of Coke Pig Iron

	Gross Tons		
	1933	1932	1931
January .....	18,348	31,380	55,299
February .....	19,798	33,251	60,950
March .....	17,484	31,201	65,554
April .....	20,787	28,430	67,317
May .....	28,621	25,276	64,323
June .....	42,166	20,935	54,621
½ year .....	24,536	28,412	61,330
July .....	57,821	18,461	47,201
August .....	59,142	17,115	41,300
September .....	.....	19,753	38,964
October .....	.....	20,800	37,843
November .....	.....	21,042	36,732
December .....	.....	17,615	31,625
Year .....	.....	23,733	50,001

## Pipe Lines

**Lycoming Producing Corp.**, Wellsboro, Pa., plans construction of welded steel pipe line from properties in Potter County field, Pa., to connection with 20-in. trunk line running to Syracuse, N. Y., about 40 miles, for natural gas supply. Company is a subsidiary of Standard Oil Co. of New Jersey, New York.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Sept. 12 for 17,250 ft. welded steel pipe (Schedule 659) for Norfolk, Va., Navy Yard; until Sept. 19 for 12,000 ft. galvanized welded steel pipe (Schedule 652) for Eastern and Western Navy Yards.

**Sarnia Oil & Gas Co.**, 110 Davis Street, Sarnia, Ont., plans construction of welded steel pipe line from natural gas properties near Sarnia to Kitchener, Ont., and vicinity, where franchises for furnishing natural gas service are being secured. Cost over \$1,000,000 with gathering and distributing lines. L. A. Wilson is general manager.

**Canton, Miss.**, plans construction of steel pipe line from Jackson, Miss., to city, about 26 miles, making connection at first noted place with pipe line system for natural gas supply. Financing being arranged. C. K. Harris, mayor, is active in project.

**Shreveport-El Dorado Pipe Line Co.**, Shreveport, La., has acquired pipe line properties of Atlas Pipe Line Co., inactive since 1901, and will consolidate with system, making extensions for connection with acquired lines.

**Western Gas Co.**, El Paso, Tex., has let contract to Bechtel-Kaiser Co., Ltd., and Henry J. Kaiser Co., 155 Sansome Street, San Francisco, for construction of 10½-in. steel pipe line from Douglas to Phoenix, Ariz., by way of Tucson, Ariz., 215 miles, for natural gas service at two cities last noted. Cost about \$2,200,000. Line will have capacity of 15,000,000 cu. ft. daily.

## SUMMARY OF THIS WEEK'S BUSINESS

# Confusion Over Code Prices and Extras Holds Back New Business in Steel

New Extras Have Just Reached the Trade and Have Not Yet Been Formally Adopted—Releases Against Contracts Improving—Steel Output Off

NEW business in finished steel is being held back pending a final adjustment of market practices to the conditions imposed by the iron and steel code. While base prices for the remainder of the current quarter have all been announced, there have been numerous changes in extras and other terms which are temporarily a source of confusion to both sellers and buyers. The caution of sales staffs has been accentuated both by the fact that the new extra lists have not yet been officially approved and by the knowledge that misinterpretation of code provisions can lead to the imposition of fines.

An added uncertainty is provided by a division of opinion on the extension of the initial code prices through the fourth quarter. Although a number of producers, particularly in the Chicago district, have opened their books at unchanged quotations for the final quarter of the year, there is a growing pressure for advances for that period, especially on sheets and strip.

MEANWHILE pig iron producers have reaffirmed their current prices for the fourth quarter, and are booking more new business, relatively, than steel makers. Pig iron shipments continue to move to foundries at a good rate, only moderately lower than that of August and July, but pig iron output is commencing to reflect decreased requirements for steel making. On Sept. 1 only 98 blast furnaces were active as compared with 106 on Aug. 1, a net loss of eight. Other stacks would undoubtedly be put out or banked but for the fact that steel producers hope for an autumn upturn in business.

It was largely because pig iron output is less flexible than steel production that the August showing of the country's blast furnaces was so favorable. Production of pig iron last month was 1,833,394 tons, or 59,142 tons a day, compared with 1,792,452 tons, or 57,821 tons daily, in July. The gain in daily rate was 2.2 per cent.

STEEL works operations continue to decline, although at a slower rate than recently. The national average, at 45 per cent of capacity, compares with 47 per cent last week, 50 per cent a fortnight ago, and 53 per cent three weeks ago. The Pittsburgh rate, during the past week, has declined from 38 to 34 per cent; the Chicago average has receded from 46 to 43 per cent; the eastern Pennsylvania figure from 40 to 38 per cent; the Valley rate from 50

to 46 per cent, and the Southern average from 54 to 46 per cent. The Wheeling district continues to operate at the high rate of 80 per cent, while production in the Cleveland-Lorain area has increased from 50 to 54 per cent.

Although new business in steel is light, there has been an increase in specifications against third quarter contracts closed at pre-code prices. This has been especially true of sheets and strip steel. The Chrysler company has released 100,000 tons of steel, for shipment prior to Oct. 15, to cover all of its requirements during the life of its present models. In general, automotive consumption of steel is declining, although not at a rapid rate. With August assemblies now estimated at 220,000 cars, the combined output of Ford, Chevrolet and Chrysler this month is expected to reach 160,000 units, insuring a production of 185,000 to 190,000 cars for the entire industry.

Sheet bookings have been enlarged by an order for 13,000 tons of galvanized material from the Argentine Government. The Chesapeake & Ohio Railroad has placed 31,500 tons of rails, and a large Eastern road has bought 5000 tons. Structural steel awards total only 9287 tons, but new fabricating projects call for 27,332 tons.

ADDITIONAL price changes under the code include varying increases on billet steel and rail steel reinforcing bars, and an advance of 40c. a base box on tin plate to \$4.65, likely to be modified, however, by a proposed 7½ per cent discount to large buyers. New extras and differentials on most important finished steel products are now in the hands of the trade, although not yet formally approved. In connection with sheets there are new gage extras on hot-rolled annealed and galvanized sheets favoring the producer. On alloy steel bars one base price of 2.45c. is established, eliminating the 2.65c. price that smaller consumers have paid. However, small buyers will be required to pay increased quantity differentials. A clear cut differentiation between bars, plates, sheets and strips and an official definition of what constitutes a jobber are among other outstanding new developments under the code.

Scrap prices are weaker, with heavy melting grade off 50c. at Pittsburgh and 25c. at Chicago. THE IRON AGE composite price for scrap has declined from \$12 to \$11.75 a ton. The pig iron and finished steel composites are unchanged at \$16.71 a ton and 1.979c. a lb. respectively.

# ▲ ▲ ▲ A Comparison of Prices ▲ ▲ ▲

Market Prices at Date, and One Week, One Month and One Year Previous  
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	Sept. 6, 1933	Aug. 29, 1933	Aug. 8, 1933	Sept. 6, 1932
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia....	\$18.34	\$18.34	\$17.34	\$13.84
No. 2, Valley furnace.....	17.50	17.50	16.50	14.50
No. 2 Southern, Cin'ti.....	18.23	18.23	17.73	13.82
No. 2, Birmingham.....	13.50	13.50	13.00	11.00
No. 2 foundry, Chicago*....	17.50	17.50	17.00	15.50
Basic, del'd eastern Pa....	17.84	17.84	17.09	13.50
Basic, Valley furnace.....	17.00	17.00	16.00	13.50
Valley Bessemer, del'd P'gh.	19.89	19.89	18.89	16.89
Malleable, Chicago* .....	17.50	17.50	17.00	15.50
Malleable, Valley .....	17.50	17.50	16.50	14.50
L. S. charcoal, Chicago....	<b>23.67</b>	23.17	23.17	23.17
Ferromanganese, seab'd carlots .....	82.00	82.00	82.00	68.00

\*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

## Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$40.00	\$40.00	\$40.00	\$43.00
Light rails at mill .....	30.00	30.00	30.00	32.00
Rerolling billets, Pittsburgh.	26.00	26.00	26.00	26.00
Sheet bars, Pittsburgh.....	26.00	26.00	26.00	26.00
Slabs, Pittsburgh.....	26.00	26.00	26.00	26.00
Forging billets, Pittsburgh..	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh .....	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.60	1.60	1.60	1.60

## Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh .....	1.60	1.60	1.60	1.60
Bars, Chicago .....	1.65	1.65	1.70	1.70
Bars, Cleveland .....	1.65	1.65	1.65	1.65
Bars, New York .....	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh .....	1.60	1.60	1.60	1.60
Tank plates, Chicago .....	1.65	1.65	1.70	1.70
Tank plates, New York.....	1.898	1.898	1.898	1.898
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.60
Structural shapes, Chicago.	1.65	1.65	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pitts-				
burgh .....	1.70	1.70	1.70	1.70
Hot-rolled strips, Pittsburgh	1.65	1.65	1.65	1.45
Hot-rolled strips, Pittsburgh	2.25	2.25	2.25	2.00

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

## Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh .....	2.25	2.25	2.25	2.10
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.20
Sheets, galv., No. 24, P'gh..	2.85	2.85	2.85	2.75
Sheets, galv., No. 24, Chicago dist. mill .....	2.95	2.95	2.95	2.85
Hot-rolled sheets, No. 10, P'gh	1.65	1.65	1.65	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill .....	1.75	1.75	1.75	1.65
Wire nails, Pittsburgh.....	2.10	2.10	2.10	1.95
Wire nails, Chicago, dist. mill	2.15	2.15	2.15	2.00
Plain wire, Pittsburgh .....	2.10	2.10	2.10	2.20
Plain wire, Chicago dist. mill	2.15	2.15	2.15	2.25
Barbed wire, galv., P'gh....	2.60	2.60	2.60	2.60
Barbed wire, galv., Chicago dist. mill .....	2.65	2.65	2.65	2.65
Tin plate, 100-lb. box, P'gh..	<b>\$4.05</b>	\$4.25	\$4.25	\$4.75

## Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh..	<b>\$13.25</b>	\$13.75	\$14.00	\$9.25
Heavy melting steel, Phila..	12.00	12.00	12.00	7.25
Heavy melting steel, Chicago	10.00	10.25	10.75	6.25
Carwheels, Chicago .....	10.50	10.50	10.50	7.00
Carwheels, Philadelphia ....	12.75	12.75	12.75	8.50
No. 1 cast, Pittsburgh.....	11.75	11.75	11.75	10.00
No. 1 cast, Philadelphia....	12.50	12.50	12.50	8.50
No. 1 cast, Ch'go (net ton)..	10.00	10.50	10.50	6.25
No. 1 RR. wrot., Phila. ....	12.00	12.00	12.00	7.50
No. 1 RR. wrot., Ch'go (net)	9.00	9.00	9.00	5.00

## Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt .....	\$2.50	\$2.50	\$2.75	\$2.00
Foundry coke, prompt.....	3.25	3.25	3.50	2.75

## Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery.	8.75	8.75	8.75	5.75
Lake copper, New York....	9.00	9.00	9.00	6.12½
Tin (Straits), New York...	<b>45.50</b>	46.12½	44.60	25.50
Zinc, East St. Louis .....	4.70	4.75	5.00	3.37½
Zinc, New York .....	5.07	5.12	5.37	3.74½
Lead, St. Louis .....	4.35	4.35	4.35	3.45
Lead, New York .....	4.50	4.50	4.50	3.60
Antimony (Asiatic), N. Y...	6.87½	6.87½	7.25	5.50

# ▲ ▲ ▲ The Iron Age Composite Prices ▲ ▲ ▲

## Finished Steel

Sept. 6, 1933	1.979c. a Lb.
One week ago	1.979c.
One month ago	1.979c.
One year ago	1.965c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	HIGH	LOW
1933 .....	1.979c., Aug. 8;	1.867c., Apr. 18
1932 .....	1.977c., Oct. 4;	1.926c., Feb. 2
1931 .....	2.037c., Jan. 13;	1.945c., Dec. 29
1930 .....	2.037c., Jan. 14;	2.018c., Dec. 9
1929 .....	2.317c., April 2;	2.273c., Oct. 29
1928 .....	2.286c., Dec. 11;	2.217c., July 17
1927 .....	2.402c., Jan. 4;	2.212c., Nov. 1

## Pig Iron

\$16.71 a Gross Ton
16.71
15.94
13.64

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

HIGH	LOW
\$16.71, Aug. 29;	\$13.56; Jan. 3
14.81, Jan. 5;	13.56, Dec. 6
15.90, Jan. 6;	14.79, Dec. 15
18.21, Jan. 7;	15.90, Dec. 16
18.71, May 14;	18.21, Dec. 17
18.59, Nov. 27;	17.04, July 24
19.71, Jan. 4;	17.54, Nov. 1

## Steel Scrap

\$11.75 a Gross Ton
12.00
12.25
7.58

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

HIGH	LOW
\$12.25, Aug. 8;	\$6.75, Jan. 3
8.50, Jan. 12;	6.42, July 6
11.33, Jan. 6;	8.50, Dec. 29
15.00, Feb. 18;	11.25, Dec. 9
17.58, Jan. 29;	14.08, Dec. 3
16.50, Dec. 31;	13.08, July 2
15.25; Jan. 11;	13.08, Nov. 22

# Pittsburgh Market Quiet With Output Off Further



**Demand for Tin Plate and Auto Body Sheets Sustained—Code Prices Remain to Be Clarified — Scrap Weaker**

**P**ITTSBURGH, Sept. 6.—Although official announcement of code prices on steel products is still pending, most producers in this district have established base prices covered in the code and have opened their books for acceptance of business on the new bases. The process of educating sales staffs and steel consuming industries to the many ramifications of code prices and terms, however, is generally slow, and both sellers and buyers are exercising extreme caution in entering new commitments before comprehensive interpretation of code details is assured. Sellers, particularly, are making sure of their ground before quoting, in view of the penalty for price irregularities which can be inflicted under the code.

Although comparatively few changes in base prices have appeared, many new extras for size, quantity and analyses present complications that are in the process of clarification. The major changes in base prices affect certain finishes of sheets, reinforcing bars and tin plate. Cold-rolled sheets, Nos. 20 and 10 gage, have been advanced \$3 a ton, and fender stock, No. 20 gage, has been marked up \$2 a ton. The separate automobile body and furniture sheet classification has been eliminated. Reinforcing steel, stock lengths as quoted by distributors, has been established at a base of 1.80c., Pittsburgh. Tin plate has been advanced 40c. to \$4.65, base, per box, Pittsburgh.

With the exception of sustained demand for auto body sheets and tin plate, general calls for steel products have noticeably decreased. Heavy hot-rolled products are still extremely quiet. Purchase of 31,500 tons of rails by the Chesapeake & Ohio has stimulated interest in the rail market. Purchasing programs of most carriers, however, remain obscure. A relatively large export order for galvanized sheets has forced a local mill to step up its production, with the result that sheet mills in this district are now engaged at about 55 per cent of capacity.

Holiday interruptions and further decreases in backlog orders, however, have caused a minor decline in ingot

output in the Pittsburgh district to 34 per cent. Production in the Valleys and nearby northern Ohio has likewise declined to 46 per cent. Operations in the Wheeling district are unchanged at 80 per cent. Raw materials are very quiet. No. 1 heavy melting steel has declined 50c. a ton to \$13 to \$13.50.

## Pig Iron

Although virtually no business has been booked by local merchant producers at the higher prices established on Aug. 29, the new quotations are definitely firm. With only a few weeks remaining in the quarter, some fourth quarter contracting is expected. Steel companies, however, have not yet manifested interest in basic iron for the coming period. Inquiry from the foundry trade still is limited to spot carload needs. Shipments against existing contracts are nearly completed, although what little tonnage remains on producers' books is being ordered out rather slowly. Neville Island has been named as a basing point for pig iron in the iron and steel code.

## Semi-Finished Steel

Prices on billets, slabs and sheet bars are established under the code by the leading producers at \$26, Pittsburgh, Youngstown or Canton; forging billets at \$31, Pittsburgh, and wire rods at \$35, Pittsburgh or Cleveland. The 1.60c., Pittsburgh or Youngstown, price on skelp also is expected to be established under the code. These prices will apply to shipment through the remainder of third quarter. The relatively well-stocked position of most sheet and strip mills has retarded further the movement of semi-finished steel. Tin plate mills, however, are an exception and continue to specify heavily for sheet bars. Demand for wire rods is only fair.

## Bars, Plates and Shapes

Soft steel bars, structural plates and shapes, though not yet officially announced under the code, are generally established at a minimum base of 1.60c., Pittsburgh. Steel sheet piling is likewise quotable at 1.90c., Pittsburgh. Quantity extras on bars are expected to be announced shortly. Reinforcing steel, cut lengths as quoted by distributors, have been es-

tablished at a base of 1.80c., Pittsburgh.

Although a number of Federal projects are in the offing, very few important jobs are being figured at the moment. Structural inquiry in the past week failed to indicate a quickening in the release of Government work, although one or two large projects that appeared some months ago have been revived. A dam on the Mississippi River at Alma, Wis., will require about 2500 tons of structural shapes. Virtually all other new structural work covers bridge construction. Private projects continue to lag. No important lettings were reported in the past week. Current demand for reinforcing bars is nil. Barge business has failed to expand in recent weeks, and movement of plates to that quarter is consequently restricted to previous commitments. Calls for plates from the brewing industry have also become infrequent, and demand from the railroads has not been significant.

## Rails and Track Accessories

Interest has been enlivened by a report that the board of directors of the Chesapeake & Ohio has sanctioned the purchase of approximately 31,500 tons of rails. Definite inquiry for this tonnage has not yet appeared, however, and the probable time of the purchase is still vague. A large Eastern carrier has placed 5000 tons of rails. The market is otherwise lacking in activity. Although some pressure is being exerted by the Federal coordinator to speed up replacement buying by the railroads, relief from internal difficulties is held essential by most carriers before purchasing programs can be expanded. The base price of steel tie plates under the code is expected to be set officially, at 1.90c. a lb., Pittsburgh, applying to 20 tons or more, and track spikes at \$2.40 base per 100 lb. Track bolts in lots of 100 will take the present discount of 73 per cent off list.

## Wire Products

With wire prices under the code still indefinable, sellers are wary about quoting against current inquiries. Bookings in the first week of the new month have been light. Current quotations are generally held at 2.10c., Pittsburgh and Cleveland, for manufacturers' wire, and at \$2.10, base per keg, for standard wire nails.

## Sheets

Although code prices for sheets have not been officially announced, books are open for acceptance of orders on the bases to be established under the code. Cold-rolled, No. 20 gage, have been advanced \$3 a ton to 2.75c., Pittsburgh, and a similar increase has been effected on No. 10 gage to 2.30c., Pittsburgh. The separate automobile body and furniture sheet classification has been eliminated. Fender stock, No. 20 gage, has been marked up \$2 a

ton to 2.95c., Pittsburgh or Cleveland.

Producers are still being pressed for deliveries on exceptionally wide cold-rolled for the motor car industry. Some sheet orders are appearing for next year's models. Demand from one auto body maker, who is occupied at capacity, is particularly brisk. Miscellaneous demand for sheets, however, continues to fall off. A local mill has booked approximately 13,000 tons of galvanized sheets to be used as locust barriers in the Argentine and is already rolling against the order. As a consequence of that business and fairly well sustained demand from the automotive industry, sheet mill operations have improved and average about 55 per cent of capacity, compared with 50 per cent last week.

#### Bolts, Nuts and Rivets

Pending establishment of prices under their own code, which will probably not be set up until next month, bolt and nut makers are adhering strictly to current prices for the remainder of third quarter. Bolts and nuts continue to be quoted at 73 per cent off list, and large rivets at \$2.50, base per 100 lb., Pittsburgh or Cleveland. A sizable tonnage of bolts will probably be required for a midtown tunnel in New York.

#### Tubular Goods

Boiler tubes and mechanical tubing will be subject under the code to the discounts which appeared on the July 10 card. Discounts on line pipe, oil country goods and standard pipe will be the same as those on the July 1 card. Current demand is meager. No new line projects have appeared. Standard pipe orders are largely restricted to scattered car lots, and calls for boiler tubes and mechanical tubing are also rather spotty.

#### Cold-Finished Bars

The 1.95c., Pittsburgh, price has been reaffirmed under the code and will be effective during the remainder of the quarter. Extras appearing on the card of Sept. 10, 1932, remain in effect. Although a slight increase in bookings was experienced in the past week, the improvement was far from significant. Warehouse demand is very light and reflects the comfortable position of jobbers' stocks which were built up prior to the price advance on Aug. 1. Tonnage requirements of the motor car and parts makers continue to shrink, but this tendency is a natural outgrowth of seasonal influences in the automotive industry.

#### Tin Plate

Mills have announced an advance in the quotation on tin plate from \$4.25 to \$4.65 base per box, Pittsburgh, with the base price at Gary 10c. a box higher. The new quotation, while effective for an indefinite period, will

probably apply to all business booked up until next year's price is announced. It is subject to a discount of 7½ per cent to large buyers. The fact that the 40c. advance per box is held to cover merely the increased cost of pig tin and excludes high wage, materials and fuel costs is considered to presage a further advance when next year's quotation is announced. Specifications are still heavy, although in the case of one mill demand for deliveries is not so insistent, and production is still at capacity. No changes have been made in prices on tin mill black plate and long ternes, which are still quotable at 2.50c. and 2.90c., Pittsburgh, respectively.

#### Strip Steel

Hot-rolled strip under the code is quotably unchanged at 1.65c. and cold-rolled at 2.25c., Pittsburgh, for delivery through the third quarter. Unimportant changes in extras for sizes and analysis are covered in the code set-up. A fair demand from the automotive industry and from miscellaneous sources is sustaining operations at a satisfactory rate. Although backlog orders are practically cleaned up, strip mill operations average 50 per cent of capacity. Specifications from manufacturers of business machines and washing machines are particularly good.

## Steel Output in the Valleys Recedes Further as Backlogs Are Reduced

YOUNGSTOWN, Sept. 5.—Although local steel makers enjoyed a month-end spurt in specifications for finished steel products, the bulge was not sufficient to offset reductions in backlogs. Operations in the Valley have consequently declined further to 45 to 47 per cent of capacity. No further serious curtailment in output is expected, however.

Current activity is sustained largely by a surprisingly good demand for full finished sheets from the automotive industry and by calls for tin plate from can manufacturers. Tin plate mills in this district are still occupied at virtual capacity, and no interruptions in present schedules are in sight for the current month. Miscellaneous steel demand is spotty. A slight improvement in interest from automobile parts makers is evident, while calls for forging billets are considered satisfactory. Common grades of sheets, however, are very dull.

Pipe production has been scaled down further in view of a scarcity of business. Small-lot orders for standard pipe are dribbling in, but line pipe is virtually dormant. Oil country goods are also quiet. The proposed 800-mile line project from mid-continental fields to Chicago has not pro-

#### Coke and Coal

This market continues under the influence of heavy covering during the recent strike. Prices for both coal and coke are nominally unchanged. The range on Connellsville furnace coke is still \$2.50 to \$2.75, ovens. Standard brands of foundry coke are offered freely at \$3.25, Connellsville, with very little being moved. Premium brands of foundry coke continue to command \$4.50, although only occasional carloads are being booked. Bituminous coal demand is extremely light.

#### Scrap

Scrap prices have yielded to the weakening influence of negligible demand. Most grades are 50c. a ton lower, although in the absence of sales quotations are largely nominal. No. 1 heavy melting steel is now quotable at \$13 to \$13.50. Dealers are able to cover against old orders rather freely at the lower price. The present easy condition of the market is not unusual in the face of further curtailment in mill operations and the generally long position of inventories. Although definite indications are lacking, the fact that most mills are covered only through September is sustaining hopes for some significant buying toward the close of the month.

gressed beyond the promotional stage, and some doubt exists whether the project will materialize. The movement of semi-finished steel has lost pace, and, with operations tending downward, some accumulation has been in progress.

Demand for the heavy hot-rolled products is apathetic. Structural shapes and reinforcing bars still await the benefit of Federal appropriations for public works and road projects, and little hope is held that much tonnage will reach local mills for some months. Demand for plates from the brewing trade has fallen off considerably, and requirements of the railroads continue to be extremely light. No important tank work is in immediate prospect.

The raw materials markets have been featured by an advance of \$1 a ton in pig iron. Basic iron is now quotable at \$17, Valley furnace, foundry and malleable at \$17.50, and Bessemer at \$18. Pig iron demand is negligible at the moment, although some fourth quarter contracting is likely by the middle of September.

Absence of mill buying has caused a noticeable softness in the scrap market. No. 1 heavy melting steel is quotably lower at \$13 to \$13.50.

# Ingot Output in Further Decline at Chicago



**Fourth Quarter Books Being Opened by Mills Although Further Price Advances Are a Possibility — Charcoal Iron Advanced**

**C**HICAGO, Sept. 6.—With the exceptions of cold-rolled strips and bolts and nuts, books are rapidly being opened for fourth quarter deliveries, and price changes for that period are not of great moment. No real rush to buy has developed. There is no doubt about confusion existing in the minds of many consumers. In the first place, they still have their own codes to deal with. Then also they have, in many instances, commitments to carry them for some time, and have as yet failed to note real signs of a fall pick-up in business.

On the other hand, specifications show a moderate gain, though current shipments are slightly lower and ingot output has dropped to a range of 43 to 44 per cent of capacity.

There are two lines of thought concerning prices not yet named for fourth quarter. Some sellers, viewing current quotations in relation to those recently obtained by preferred buyers, prefer not to go higher for the final period of the year. Others think of the low level of previous prices and now want to get on a more profitable selling basis before they book business for the fourth quarter.

The structural steel market, bolstered by inquiries for dams on the Mississippi River and various highway bridge projects, gives more promise than at any time for several months. An award of 1500 tons for a distillery is outstanding in this week's business. The rail market is quiet, but a small purchase by a Northwestern railroad is taking shape.

## Pig Iron

Fourth quarter prices for charcoal iron have been announced at \$20.50 a ton, furnace, or \$23.67 delivered Chicago. This product is moving in moderately better volume. On the whole, the pig iron market is holding reasonably steady. New buying is in moderate volume, but shipments have not yet shown an upturn from the average in August. Most foundries report business a little less active. About 2500 tons of castings will be required for locks and gates at three dams to be built on the Mississippi River.

## Reinforcing Bars

This market is extremely quiet except for an inquiry for a distillery at

Peoria, Ill., and a few scattered Federal projects, such as dam and lock work on the Mississippi River. Iowa is placing a few road bars, but in Illinois work is practically at a standstill notwithstanding that Federal aid is available. Chicago base prices are now being quoted on reinforcing bars. The rail steel product is priced at 1.80c. a lb., Chicago, and billet reinforcing bars are quoted 1.85c., Chicago or Gary. Billet bars are subject to cutting extras which bring actual prices for practically all tonnage that will move to 1.95c. a lb.

## Cast Iron Pipe

The process of granting Federal loans is slow and as a result this market is dragging. Eau Claire, Wis., has placed 1500 tons on condition that a Federal loan is made available. The loan requested for the sewage plant at Milwaukee is said to have received favorable consideration. Private business is very dull, especially on the part of utilities, which are still under severe pressure as to their rates. Prices for cast iron pipe are firm.

## Wire Products

A decline in industrial demand, as well as slowness by jobbers in replacing tonnages moved in August, has resulted in lower output, the average now being about 50 per cent of capacity. There are as yet no definite signs of a fall pick-up, though hardware wholesalers look for brisk business the latter part of this month. Mills are opening books for the fourth quarter at current quotations.

## Cold-Rolled Strips

There is some confusion concerning prices for the fourth quarter. Some producers are willing to carry forward the 2.25c. quotation, while others believe a higher price is justified for delivery in the last three months of the year. Opposition to a change is due mainly to the fact that, at 2.25c., there is already a wide spread over the preferred prices extended to some consumers prior to the filing of quotations under the code.

## Sheets

Books are open for fourth quarter deliveries at unchanged prices. New business is coming in slowly, partly for the reason that deliveries already extend six to eight weeks, and not many consumers can see beyond that

time. In the meantime specifications are steady and hot mills are engaged at close to capacity. The principal consumers are automobile manufacturers and beer keg plants. Miscellaneous manufacturers are also well represented in current shipments.

## Rails and Track Supplies

Current prices for rails and track accessories are being carried forward for deliveries in the fourth quarter. Current business is dull. Several Western railroads have released small tonnages of rails against old commitments. Rail inquiries are lacking, though there is a possibility that a Northwestern railroad will soon be in the market for a moderate tonnage.

## Bars

Most producers have opened books for mild steel bars at 1.65c. a lb., Chicago, for fourth quarter deliveries. New buying is sluggish, but specifications are slightly heavier. The main support of this market is still the automobile industry, but farm machinery plants are taking more bars and are on the verge of increasing their requirements.

## Plates

New plate business is confined largely to the requirements of breweries, though a substantial tonnage will be needed for three dams that are to be constructed on the Mississippi River. Miscellaneous orders from tank builders are holding up well considering the general lull in steel business. The Burlington will put in use about the middle of the month the first of three new Diesel electric switching engines. Most producers are opening fourth quarter books at current quotations.

## Structural Material

Awards, at about 3000 tons, hold the gain of last week, while fresh inquiries, at 10,000 tons, are distinctly encouraging. The largest single award is for a distillery at Peoria, Ill. Outstanding among inquiries are 7000 tons for dams on the Mississippi River. Books for fourth quarter are rapidly being opened at 1.65c. a lb., Chicago.

## Scrap

Heavy melting steel has eased off 50c. to \$10 a gross ton, delivered. This price is established by a recent mill purchase and the best offers that other consumers will make to dealers. Supplies are more than adequate under existing conditions, which include curtailed ingot output and accumulations of pig iron and scrap in mill yards. Also, at this time, several blast furnaces are banked and others could well be banked except for the fact that steel producers look for a Fall upturn. For the time being there is a surplus of steel mill pig iron, and scrap consumption is suffering accordingly. Use of cast grades is slow and prices are sinking.

# Eastern Pennsylvania Rate Sinks as Demand Shrinks



**Ingot Output Now 38 Per Cent—Confusion Over New Steel Extras is a Retarding Influence—7500 Tons of Basic Pig Iron Bought**

**P**HILADELPHIA, Sept. 6.—While still lagging, the market has shown mild improvement. Confusion over the new price set-up under the code still exists, particularly regarding extras and differentials, and though it is expected to take some time to clear up all points and acquaint buyers with them the situation gradually is being cleared up. Buyers' acceptance of the code has been favorable on the whole.

Prices are quoted for specification over the remainder of September, and present indications are that few if any changes will be made for the fourth quarter.

August saw a rather sharp drop in business compared with July and, unless demand picks up, September will see smaller bookings than those of August. Output also is declining and is down two points to 38 per cent of open-hearth capacity. Mills still have a good backlog in sheets, some having enough tonnage to carry them through September at the present high rate of production. On plates, shapes and bars, mills are in a less comfortable position, with incoming business on a small scale, despite the slight gain of the past week.

The largest pig iron sale in some time has just been closed, and involved 7500 tons of basic iron for an eastern Pennsylvania consumer.

## Pig Iron

A nearby melter has just closed for 7500 tons of basic iron, purchased from an eastern Pennsylvania furnace for fourth quarter delivery. Under the new adjustment basic iron is quoted at \$17, furnace. Inquiries for foundry grades have increased somewhat, and a number of sales for delivery over the final quarter have been made at the new base price of \$17.50. August sales were about on a parity with those of July.

## Plates, Shapes and Bars

The code prices reaffirm former quotations of 1.70c., Coatesville, for plates; 1.70c., Bethlehem, for shapes; and 1.60c., Pittsburgh, on merchant steel bars. Demand has reflected a mild improvement, but remains on a low level. Railroads are buying moderately, but there is a growing doubt that they will come into the

market over the remainder of the year for large requirements unless carloadings show further improvement. Mills, however, are hoping that efforts being made in Washington to induce the railroads to enter upon a large-scale purchasing program will prove successful.

## Sheets

Bookings have fallen off sharply. The difficulty of working out extras and differentials under the code apparently has been a retarding influence, but a greater factor is the slackening requirements of consumers.

## Steel Output Unchanged at Buffalo

**B**UFFALO, Sept. 6.—With Buffalo pig iron prices fixed for the fourth quarter, subject to approval by those charged with review of new quotations, sellers look for a quick pick-up in business after 10 days of inactivity. The new prices are based on a \$17.50 quotation for No. 2 plain foundry iron, with 25c. differentials for each 25 points of silicon above or below the base grade. Discounts are allowed for lower than 1.75 per cent silicon and premiums are asked for silicon in excess of that percentage. A similar price range is quoted on malleable except that the base is \$18 and no allowance is made on iron with silicon content below that of the base grade. This makes the total advance in Buffalo iron \$1.50, since there was a \$1 increase in the early summer. There has been no buying of consequence, as sellers' books were not opened until Sept. 1. Production is unchanged. Shipments during the past 10 days have shown some curtailment, but continue near the year's best level.

## Steel

Labor troubles have ended in local steel works, but operations continue unchanged, the tentative schedule for this week calling for 41 per cent production in the Buffalo district. Operations at the Bethlehem plant continue very slow, with only four open-hearthings in production. Republic has

Automotive body makers are showing less interest in the market, but it is reported that prospects for improved buying are good as the season for new car models approaches. There has also been a let-down in purchases by radio, electric refrigerator and stove manufacturers.

## Warehouse Business

The market is holding up fairly well, though demand is light. Prices are unchanged.

## Imports

The following iron and steel imports were received here last week: 5500 tons of manganese ore from Cuba, 1430 tons of pig iron from British India, 25 tons of tungsten ore from China, 20 tons of steel bands from Germany, 3 tons of steel tubes and 1 ton of steel bars from Sweden.

## Scrap

The market remains dull, and in the absence of a test, prices remain unchanged. The undertone, however, appears to be fairly strong, though perhaps somewhat easier.

eight active and Wickwire two. The usual Labor Day curtailment of production took place. Sheets are moving more slowly, with district operations near the general level of steel output. Better demand for structural steel is looked for in this district, and some sizeable rail releases are expected this month.

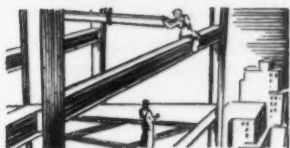
## Scrap

The market is inactive. Melters continue to import scrap heavily by Lake and barge canal and are not currently in the market for yard or nearby material. Prices are holding steady, although they are largely nominal.

## Steel Barrel Production Down, Stocks Up

**W**ASHINGTON, Sept. 5.—The output of steel barrels declined to 555,404 or 41 per cent of the capacity of the 26 establishments reporting to the Bureau of the Census from 572,851 or 42 per cent of capacity in June. Stocks rose to 28,668 from 26,187 while unfilled orders for delivery within 30 days at the end of month increased to 286,702 from 214,949. Unfilled orders for delivery beyond 30 days declined to 361,222 barrels from 426,492. In the first seven months of the current year the output of steel barrels totaled 2,930,055 compared with 3,065,452 in the corresponding period of last year.

# Finished Steel Releases Are Maintained in New York Area



**Selling Efforts Relaxed During Clarification of Code Quotations — Tin Plate Price Advanced But Is Subject to Discount**

**N**EW YORK, Sept. 6.—Although the three-day holiday, coupled with the necessity of a thorough dissemination among salesmen of price information as filed under the steel code, brought an almost complete halt in steel selling efforts during the last week, specifications against old contracts held up fairly well. Many consumers are already hastening their efforts to place releases against old contracts by the end of the quarter as code prices during the last three months of the year are expected to be rigidly enforced. Such tonnage is likely to increase throughout the month but on most products shipments must be completed by Oct. 1 rather than Oct. 15, as has been the case in the past.

Demand for heavy hot-rolled products continues light although large plate projects are coming up in various parts of the country. Sufficient appropriations have now been made at Washington to bring the steel industry much tonnage but delay is being encountered in the agencies which actually spend the money. It now appears that pipe lines, particularly for the piping of gas to municipalities, may receive an impetus from Federal aid. A number of tentative inquiries are already before the trade. Railroad purchases are featured by an order for 31,500 tons of rails from the Chesapeake & Ohio. Another large Eastern carrier has released 5000 tons. Demand for plates, shapes and sheets for car repair purposes is well maintained.

Announcement of \$4.65 a base box, Pittsburgh, on tin plate for the fourth quarter had been generally anticipated in the trade and will affect little tonnage. Of more than usual interest is the fact that large buyers will be given a 7½ per cent discount on this price. Clarification of the term "large buyers" may be made later, although the discount has already been made available to a number of buyers. On other finished steel products the price structure is clearly defined by quotations filed under the code and extension of these figures into the fourth quarter is expected to be formally accomplished by refiling prior to Sept. 20.

The projected tunnel under the Hudson River to connect Weehawken, N. J., with midtown New York will

require 50,000 tons of cast iron tunnel segments, in addition to large unestimated tonnages of structural steel and reinforcing bars. With federal aid now practically assured, work on the job will probably go ahead immediately and the Port of New York Authority will ask for bids on the segments prior to the letting of the general contract.

## Pig Iron

Sellers have opened books for the remainder of the year, but consumers have indicated only a slight interest, even though most old contracts have been filled. The current market is quiet, and fresh purchasing is confined to carloads. Open inquiry is negligible. Several producers consider a price rise during the last quarter as extremely likely. Shipments continue well ahead of contracted estimates, and many Connecticut foundries have increased melting schedules to cover the seasonal demand for oil-burner castings. Bookings for the week aggregated 2200 tons, of which about 800 tons is for September shipment. The previous week's sales totaled 2500 tons and 3000 tons was placed the week before. For Eastern delivery, Lake Superior charcoal iron has been advanced 50c. a ton to \$20.50, f.o.b. Michigan furnace.

## Reinforcing Steel

Awards for the week were limited to miscellaneous New York highway mesh tonnages. American Steel & Wire Co. received additional bookings aggregating 375 tons, and Wickwire Spencer Steel Co. was awarded 300 tons. Pending requirements involve weekly awards of about 500 tons of mesh from New York and New Jersey road contractors, together with 250 tons of bars for a New York grade crossing and a Port Kennedy, Pa., factory building. In addition bids will soon be announced for 1400 tons of bars for substructure and approaches for bridges in Erie and Niagara counties, New York, and 350 tons of bars for construction work by the first district United States Engineers.

Buyers and sellers are examining the published prices, and there is a general expectation of more liberal specifying now that code provisions are more clearly defined. Established schedules for cut lengths of billet re-

inforcing bars indicate a \$3 a ton advance to a level of 1.90c. a lb., Pittsburgh. Mill lengths call for a reduction under cut lengths of 10c. a 100 lb. Rail steel bars are based \$1 a ton higher at 1.75c. a lb., Pittsburgh, with Buffalo base further advanced \$1 a ton to 1.80c. a lb. Recognized distributors, under the new provision, will be afforded quotations \$4 a net ton under base prices. Charges for size extras remain unchanged.

## Scrap

Mills show no general tendency to reenter the present market for scrap requirements. Price offerings for rail loading have generally eased off. The market tone, however, has improved considerably on the strength of considerable export activity, and the consequent removal of scrap is expected to result in general price hardening with the first recovery in domestic demand. Moderate tonnages of No. 2 heavy melting steel have been purchased at \$6, rail, and machine shop and short shoveling turnings have dropped 50c., to \$4 a ton, for rail loading. No. 2 cast is higher with barge quotations up to \$7.50 a ton. A local broker placed a sizable tonnage of heavy melting grades for Italian melters, and most of the steel will move from this district.

## Additional Steel for Coast Bridge Placed

**S**AN FRANCISCO, Sept. 5.—Foreign steel tonnage shipped into Pacific Coast ports showed a decided downward trend in the first five months of the year. Imports in January were 6930 tons, following which there was a steady falling off to 2730 tons in May. Total steel imports during this period were 27,961 tons as against 47,893 tons in the first five months of 1932. The decline is attributed mainly to the fall in dollar exchange.

Structural steel awards for the week have been slightly heavier, with 2705 tons reported as booked. Reinforcing lettings were limited to 402 tons, while plate awards totaled 9665 tons. Little activity was reported in cast iron pipe.

Outstanding among the steel awards were 1454 tons of shapes and 9290 tons of plates for the San Francisco-Oakland bridge. A minimum of 13,973 tons of steel for this structure is yet to be placed by the general contractors.

New inquiries, calling for 681 tons of structural steel and 765 tons of reinforcing steel, are principally for highway work. The State of California has awarded a general contract for license plates, calling for 2700 tons of black sheets, which represents requirements over the next two years.

# Confusion Over Code Extras Checks Buying at Cleveland



**But Sheet and Strip Releases Against Old Contracts Are Heavy — District Ingot Rate Increases Four Points to 54 Per Cent**

**C**LEVELAND, Sept. 6.—The volume of business in most steel products is being retarded by the confusion caused by the adoption of new differentials and extras under the steel code. Steel companies have not yet sent out new price books to their sales offices, although preliminary lists have been issued covering some of their products. Consumers are withholding orders until they can familiarize themselves with the cost under the new extra lists of the material they use.

Sheets and strip steel are the only steel products in which activity is well maintained. Good releases continue to come both from the automotive industry and from other consumers. Buyers are rushing in specifications against third quarter contracts for those grades of sheets that have been advanced and for cold-rolled strip, which also has been marked up, and it is expected that little unfilled tonnage of steel taken at below the new prices will be unspecified at the deadline date, Sept. 15.

Gage extras have been increased on hot-rolled annealed and galvanized sheets and on long ternes. Sharp advances have been made in quantity extras for sheets in odd sizes in less-than-carload lots. No announcement has been made regarding fourth quarter prices which, under the code, could not be named until Sept. 1. It is believed, however, that the prices, as named, will be carried through the fourth quarter except possibly on hot-rolled strip. There are reports that this product will be advanced \$2 a ton to 1.75c.

Ingot output in the Cleveland-Lorain territory has been stepped up four points to 54 per cent of capacity after a rather steady decline from the July peak. The increase was caused by the addition of two open-hearth furnaces by the Otis Steel Co. The Chesapeake & Ohio Railroad has authorized the purchase of 31,481 tons of rails. These probably will be distributed this week between leading makers.

## Pig Iron

Present prices have been extended through the fourth quarter. These prices were advanced \$1 a ton when new schedules were filed under the code. A provision of the code did not allow furnaces to quote before Sept.

1 prices for delivery for the last quarter. Some interest in the fourth quarter has developed since the naming of prices. One producer is figuring on inquiries for 3000 tons, including one 1000-ton lot. While shipments to most consumers averaged about the same in tonnage in August as in July, releases by two or three consumers resulted in considerable gain in shipments by a leading consumer last month. Foundry and malleable iron are quoted at \$17.50, Lake furnace.

## Iron Ore

Water shipments during August were 5,100,702 tons as compared with 3,430,785 tons in July. Shipments to Sept. 1 were 10,795,398 tons, an increase of 516.90 per cent over the same period last year, when the movement was 1,749,927 tons.

## Strip Steel

Heavy specifications for both hot and cold strip have been placed by some of the motor car plants that have good production schedules for September, and prompt deliveries are urged. New demand for cold-rolled strip has declined. Under the code producers are not allowed to ship cold-rolled seconds in an order for primes. New drawing extras are provided for hot-rolled strip.

## Bars, Plates and Shapes

Specifications against contracts for these products are rather light and little new business is being placed. Many consumers are holding back until the situation in respect to new extras is clarified. Cleveland will take bids Sept. 6 for extensions to the eastern sewage disposal plant, requiring 200 tons of structural steel and 765 tons of reinforcing bars. Ohio will take bids Sept. 15 for bridge and road work, requiring little structural steel but a fair tonnage of reinforcing bars. New billet steel bars, in cut lengths, have been established at 1.85c., Cleveland and Youngstown. Merchant bars are quoted at 1.65c., Cleveland, and plates and shapes at 1.60c., Pittsburgh.

## Alloy Steel Bars

One base price of 2.45c. is established under the code, thus eliminating the 2.65c. price that smaller consumers have paid. However, smaller consumers will have to pay increased quantity differentials, which take the

place of the regular merchant bar quantity differentials that were formerly used. The new quantity differentials are 4000 to 6000 lb., \$2 per ton; 2000 to 4000 lb., \$4 per ton; 1000 to 2000 lb., \$8 per ton; under 1000 lb., \$12 per ton. Alloy steel billets are \$49 per gross ton, or the net ton bar base. Alloy differentials are unchanged.

## Sheets

Specifications are holding up well against contracts and most consumers are expected to order out before Sept. 15, the deadline, nearly all the steel against contracts taken at lower prices than are now prevailing. Little business has been taken at the new prices. Numerous changes in differentials and other extras have caused confusion among both buyers and sellers. New size extras are provided for hot-rolled annealed sheets, which differ from the extras for cold-rolled and enameling sheets. There are new gage extras favoring the producer for hot-rolled annealed and galvanized sheets. No. 18 gage hot-rolled annealed sheets, largely used by the steel barrel people, are now only 15c. under base as compared with the old 30c. differential. Radical changes have been made in quantity differentials on all grades.

## Scrap

While some demand from consumers to cover September requirements is expected shortly, the market at present is virtually at a standstill. Mills are still restricting shipments. In spite of inactivity, prices are steady and not much scrap is being offered, as there is a disposition to hold scrap for possible price advances.

## Price Changes Are Features at St. Louis

**S**T. LOUIS, Sept. 6.—The advance of 50c. a ton in the price of pig iron by makers in the South and North, including Granite City, has had no effect on buying, probably on account of the Labor Day holidays, but a buying movement is expected to develop shortly. The new prices, which became effective Sept. 1, also are for fourth quarter. Shipments during August were well maintained. Pig iron prices are now being figured on the basis of the price f.o.b. Granite City, plus the actual freight charges and surcharge to the foundry desired, instead of the average rate of 83c. Southern iron is being sold at 38c. a ton less than the delivered price from Granite City.

In the steel market new prices have been issued on plates, shapes and bars for the remainder of the third quarter. In the Chicago base prices the differential over the Pittsburgh base has been reduced from \$2 to \$1 a ton. The Birmingham base remains

unchanged at \$3 a ton higher than Pittsburgh. Business continues quiet.

Laclede Steel Co. has been awarded 140 tons of reinforcing bars for the physics building at Washington University.

The market for scrap is quiet. Steel mills in the district declined to commit themselves until after Labor Day. Prices are unchanged.

## Southern Producers Open Books for Fourth Quarter

**B**IRMINGHAM, Sept. 6.—Books were opened Friday by Birmingham pig iron producers with \$13.50 as the base price for September and for the fourth quarter. As previously reported, an advance of 50c. a ton was made ten days ago. There has been little activity in the market lately. The price increase was not preceded by any protective buying, as it was made suddenly and without notice. August shipments were from 10 to 15 per cent behind those of July. Eight blast furnaces are operating, no change having taken place last week. This week Republic Steel will change one of two active furnaces from foundry iron to basic. This will give the district three on basic and five on foundry iron.

Cast iron pipe plants are still operating on a restricted basis. Some of the present production is being stocked. Pipe bookings last month were from 25 to 40 per cent under those of July.

### Steel

New steel tonnage is still limited, with demands in all lines reduced. Books are now open for fourth quarter business, with base prices for bars, plates, shapes and sheets the same as for August. No changes were made last week when prices were filed under the terms of the code. Thirteen open-hearths were worked last week, but this week there will be a reduction to 11. One company closed down its finishing mills Saturday and will reopen on Wednesday.

## Scrap Gives Further Ground at Detroit

**D**ETROIT, Sept. 6.—Steel scrap has given further ground, with heavy melting steel, hydraulic bundles and low phosphorous plate scrap down 25c. a ton. Steel mills are disinterested in purchasing scrap at the moment, being occupied chiefly with straightening out problems pertaining to the code. Local dealers expect the lull in buying to continue for at least the next week or two.

## Pig Iron Sold at Code Prices in New England

**B**OSTON, Sept. 6.—Business in pig iron subsided noticeably the past week, sales aggregating 1000 tons only, for delivery prior to Oct. 1. All sales were made at the higher prices established a week ago. Little credit is given here to the report that 12,000 tons of iron was recently purchased by a New England consumer. There is but one consumer that could purchase such a tonnage and it has enough iron on hand to last many months, based on current plant activity. There is no inquiry of importance, but several melters intimate they will be in the market around the middle of the month for round tonnages.

In the scrap market demand for chemical borings for New Jersey consumption is quite active, and prices are \$1 a ton higher as a result. Otherwise scrap continues practically at a standstill. Shipments are being held up by eastern Pennsylvania and Pittsburgh district consumers and New England users apparently have sufficient stock on hand for current requirements.

The Governor of Massachusetts has approved a rather elaborate construction plan under the recovery act, and it has gone to Washington for Government approval. Washington authorities already have approved a new bridge at Quincy, Mass., over the Fore River.

## Pig Iron Demand Active at Cincinnati

**C**INCINNATI, Sept. 6.—Pig iron purchases in August were on a parity with July, and ahead of August, 1932, by a wide margin. Shipments declined from the July level, but were better than in any other month in the past two years. Despite the price increase, bookings in the past week totaled about 1100 tons, an amount considered close to the normal four years ago. One southern Ohio consumer purchased 500 tons of Northern foundry iron at the market quotations. Price competition has diminished under the N.R.A. influence, while at the same time buyer confidence has strengthened. Furnace interests are particularly pleased over the possibility that, under Government control, melters will no longer indulge in the practice of delaying specifications on contracts. Except for an inquiry from an Indiana melter for 1500 tons of malleable iron, pending business is negligible.

### Coke

Price advances in by-product foundry coke failed to affect the market. Shipments in August receded from the

July level, but were nevertheless better than the anticipated August consumption.

### Steel

Steel demand is being sustained at close to 70 per cent of mill capacity, while production is being maintained on a parity with bookings. Price changes under the steel code have been accepted, and resistance to quotations is negligible. Backlogs, equal to about two weeks' operations, remain intact. Small specifications for new automobile models are being received, but have not reached important proportions.

### Scrap

Trading in scrap is still tinged with caution. Prices are a little firmer than last week, but the supply of material is still restricted. Mills are accepting scrap on contract, but new sales reveal some price resistance.

## Reinforcing Steel

### Awards 1565 Tons—New Projects 3338 Tons

State of New York, 375 tons, road mesh, miscellaneous highway lettings, to American Steel & Wire Co.

State of New York, 300 tons, road mesh for miscellaneous highway construction, to Wickwire Spencer Steel Co.

Valley Forge, Pa., 100 tons, building for Ehret Magnesia Mfg. Co., to Kalman Steel Corp.

Chicago, 300 tons, grain elevator, to Inland Steel Co.

St. Louis, 140 tons, Physics building for Washington University, to Laclede Steel Co.

Valley County, Idaho, 104 tons, two state highway bridges, to Pacific Coast Steel Corp.

Clatsop County, Ore., 142 tons, state highway bridge, to Mercer Steel Co.

State of Montana, 104 tons, highway bridge in Roosevelt and Richland Counties, to Pacific Coast Steel Corp.

### NEW REINFORCING BAR PROJECTS

Eric and Niagara Counties, N. Y., 1400 tons, bars for bridge substructures and approaches; bids Sept. 14.

New York, 350 tons, for United States Engineers; award announcement to be made shortly.

Cleveland, 675 tons, Easterly Sewage Disposal plant; bids Sept. 7.

Peoria, Ill., 200 tons, distillery for Hiram Walker & Sons.

State of Colorado, 112 tons, highway work in four counties; bids Sept. 8.

State of California, 173 tons, highway work in nine counties; bids Sept. 21.

State of California, 115 tons, bridges over Russian River and in San Bernardino County; bids Sept. 20.

Los Angeles, Cal., 200 tons, Medical Association library, general contract awarded.

Spokane, Wash., 113 tons, county bridge over Government Way Road; bids Sept. 12.

# Fabricated Structural Steel

Awards of 9287 Tons—New Projects Total 27,332 Tons

**S**TRUCTURAL steel awards, at 9287 tons, compare with 9900 tons last week and 4800 tons a fortnight ago. Among new projects the Grand Island bridges at Niagara, N. Y., will take 12,000 tons, while Mississippi River dams will require 7000 tons of structural steel, in addition to 7500 tons of sheet piling and 2500 tons of castings. Fabricated plate awards of the week total 10,725 tons, while new projects call for 10,000 tons. Structural steel lettings for the week follow:

## NORTH ATLANTIC STATES

Wantaugh, N. Y., 1000 tons, bridges for Jones Beach Parkway, to Harris Structural Steel Co.

Mt. Morris, N. Y., 680 tons, State Tuberculosis Hospital, to American Bridge Co.

Sullivan County, N. Y., 230 tons, highway bridge, to National Bridge Works.

## THE SOUTH

State of Virginia, 660 tons, James Madison Memorial Bridge, to Virginia Bridge & Iron Co., Inc.

Triadelphia, W. Va., 125 tons, bridge, to Fort Pitt Bridge Works Co.

## CENTRAL STATES

Chicago, 350 tons, Ashland Avenue Bridge, for Atchison, Topeka & Santa Fe Railroad, to Hansell Elcock Co., Chicago.

Peoria, Ill., 1500 tons, distillery for Hiram Walker & Son, to Mississippi Valley Structural Steel Co.

Wabash Railroad, 350 tons, bridges, Raymond and Urbana, Ill., to American Bridge Co.

South Bend, Ind., 225 tons, Muessel Brewery, to Edwards Iron Works.

Fort Wayne, Ind., 160 tons, brew house, to Whitehead & Kales Co.

Port Washington, Wis., 315 tons, transmission towers for Milwaukee Electric Railway & Light Co., to Blaw-Knox Co.

Saint Paul, Minn., 125 tons, Saint Paul Brewing Co., to Saint Paul Foundry Co.

Teney County, Mo., 125 tons, bridge, to Stupp Brothers Bridge & Iron Co.

State of Idaho, 340 tons, highway bridge, to Pittsburgh-Des Moines Steel Co.

## WESTERN STATES

San Francisco, Cal., 1454 tons additional, San Francisco-Oakland bridge West Bay sub-structure caissons, to Moore Dry Dock Co., which sublet a total of 3754 tons to Judson-Pacific Co.

Trona, Cal., 485 tons, Soda Products building, to Virginia Bridge & Iron Co., Inc.

State of Montana, 948 tons, highway bridge in Roosevelt and Richland Counties, to McClintic-Marshall Corp.

Walla Walla, Wash., 100 tons, power house at State prison, to Union Iron Works.

Los Angeles, Cal., 115 tons, widening viaduct at Itonia Ave., to Columbia Steel Co.

## NEW STRUCTURAL STEEL PROJECTS

### NORTH ATLANTIC STATES

Niagara, N. Y., 12,000 tons, Grand Island bridges. Bids Sept. 14.

Winthrop, N. Y., 170 tons, State highway bridge.

Westfield, N. Y., 315 tons, State highway bridge.

Hasbrouck Heights, N. J., 300 tons, State highway bridge.

Lewisburg, Pa., 600 tons, Lewisburg hotel.

Barker's Landing, Del., 185 tons, bridge for Delaware State Highway Department. Snyder Engineering Co., Middlesex, N. J., low bidder.

## CENTRAL STATES

States of Illinois and Missouri, 600 tons, bridges.

Mississippi River, dams, 7000 tons, of structural steel and 7500 tons of sheet piling at Canton, Mo., Alma and Fountain City, Wis.

Lee, Iowa, 370 tons, highway bridge.

Cleveland, 200 tons, Easterly Sewage Disposal plant. Bids Sept. 7.

State of Iowa, 600 tons, highway bridges.

State of Oklahoma, 850 tons, highway bridges.

Latimer County, Okla., 133 tons, highway bridge; bids opened Sept. 5.

State of Arkansas, 500 tons, highway.

Omaha, Nebr., 2500 tons, bridge.

## WESTERN STATES

Kit Carson County, Colo., 134 tons, state highway project, bids Sept. 8.

State of California, 265 tons, bridge over Russian River near Preston; bids Sept. 20.

State of Arizona, 260 tons, Globe-Show highway project; bids Sept. 18.

Alaska, 350 tons, highway bridges, United States Department of the Interior.

## FABRICATED PLATE

### AWARDS

Buenos Aires, Argentine Republic, 235 tons, small tanks for Ultramar Petroleum Co., to McClintic-Marshall Corp.

Fort Wayne, Ind., 250 tons, 78 tanks for Centlivre Brewing Co., to Western Gas Construction Co.

Decatur, Ill., 340 tons, tanks for Leader Iron Works, to Lukens Steel Co.

Fort Wayne, Ind., 135 tons, 62 tanks for Berghoff Brothers Brewing Co., to Western Gas Construction Co.

Oleum, Cal., 200 tons, stills for Union Oil Co., to Consolidated Steel Co.

Seattle, Wash., 275 tons, stock for Todd Dry Dock Co., to five bidders.

San Francisco, Cal., 496 tons, San Francisco-Oakland bridge East Bay sub-structure caisson, to Berkeley Steel Construction Co.

San Francisco, Cal., 8794 tons, San Francisco-Oakland bridge West Bay sub-structure caissons, to Moore Dry Dock Co., which sublet to Western Pipe & Steel Co.

## NEW PROJECTS

Tacoma, Wash., 10,000 tons, Green River water line, application being made for loan.

## Cast Iron Pipe

Eau Claire, S. C. (P. O., Columbia, S. C.) asks bids until Sept. 12 for 8000 ft. 8-in., and 15,000 ft., 6-in. pipe, with valves, fittings, etc., for water distributing system. Ryan Engineering Co., Arcade Building, Columbia, engineer.

Ionia, Mich., plans installation of about 33,000 ft., 8, 6 and 4-in. pipe for water system extensions. Entire program, with reservoir, estimated to cost \$70,000. L. I. Hale, engineer.

Moorehead, Minn., plans installation of 8000 ft. 8- to 12-in. pipe in connection with new sewage disposal plant. Bonds for \$150,000

authorized for project. Buell & Winter Engineering Co., Insurance Exchange Building, Sioux City, Iowa, engineer.

Elgin, Ill., plans installation of new 12-in. trunk lines for water supply in number of streets. Cost about \$79,000. Financing being arranged. V. H. Kasser, city engineer.

Moorefield, W. Va., will purchase about 12,000 ft. 6-in. and 12,000 ft. 4-in. pipe for water supply system. Entire project will cost about \$30,000. C. E. Tauskey, engineer, Oak Hill, W. Va.

Brookline, Mass., has awarded 262 tons of 6- to 16-in. pipe to the Warren Foundry & Pipe Co.

Eau Claire, Wis., has awarded 1876 tons of 6- to 30-in. to James B. Clow & Sons.

Oshkosh, Wis., has awarded 3504 lin. ft. of 6-in. class C pipe to Glamorgan Pipe & Foundry Co.

Signal Hill, Cal., awarded 333 tons of 6 to 16-in. to American Cast Iron Pipe Co.

Olympia, Wash., awarded 120 tons of 4 to 10-in. to American Cast Iron Pipe Co.

Tacoma, Wash., has taken bids on 130 tons of 12-in.

Compton, Cal., will take bids until Sept. 19 on 66 tons of 4 and 6-in.

## Canadian Steel Aided by Mining Activity

**T**ORONTO, ONT., Sept. 6.—New business is maintaining a steady level in Canadian iron and steel markets and production is holding at 50 per cent of capacity. Steel demand from the automotive and mining industries shows no abatement. Mining operations in Canada are at their peak level for all time, with the result that there is a large and growing demand for tools, machinery, milling equipment, etc. Building trades, however, are dull.

Pig iron sales are showing improvement. While melters are not placing forward delivery contracts they are entering the market at regular intervals for spot needs. Pig iron production is at its high level for the year, with four stacks turning out a total of about 40,000 tons a month. Prices are without change.

## Charcoal Iron Prices Advanced 50c. a Ton

**C**CHARCOAL iron prices have been advanced 50c. a ton to \$20.50, f.o.b. furnace, for the base grade, by the Superior Charcoal Iron Co., Grand Rapids, Mich. For higher silicon irons, a differential over and above the base grade is charged, as well as for grades Nos. 5 and 6, which are extremely hard chilling irons.

## Railroad Equipment

Fruit Growers Express is in the market for 670 underframes.

U. S. Engineers, Portland, Ore., will take bids Sept. 13 on 285 tons of rails, 38 tons of bolts and 35 tons of spikes.

# Major Prime Western Producers Withdraw From 4.70c. Market

Lead Quotations Hold Firm; Bookings Approximate Daily Intake—Copper Firm But Ignored—Tin Inactive

NEW YORK, Sept. 6.—All producers continue to hold electrolytic copper firmly at 9c. a lb., delivered Connecticut Valley. Buying activity is light. Consumers have been unable to find resale metal at shaded levels. Both buyers and sellers are watching the code discussions, and activity will probably not reappear until the industry returns to a more settled condition. Most of the current sales are for prompt delivery, although a little tonnage has been booked through December. A satisfactory volume of shipments has been maintained, but the total August tonnage will probably not reach that of July.

August reductions should result in total visible stocks approaching the 400,000-ton point. Smelters will probably wait until stocks reach 150,000 tons before easing up on the present production restriction. A steady increase of Continental booking is reported.

## Zinc

Although consumers are only moderately covered, they are receiving so little encouragement from smelters to take metal at present prices that bookings are in very low volume. General inquiry is very light. With Prime Western at 4.70c. a lb., East St. Louis, major first hands have withdrawn from the present market, and are not inclined even to cover their long-standing accounts. Some metal is reported as available at 4.65c., but consumers are unable to uncover any worth-while tonnage at that figure. It is believed in the trade that 4.70c. represents the low point, and is even a nominal quotation. Although no shipping postponements have been made, it is indicated that the July carry-over will cause August shipments to fall below July. Very little easing of fabricating activity is reported, and consumers will probably be forced to replenish yard stocks partially within

the next few weeks. Any buying activity will likely harden prices materially. The weak position of Prime Western resulted in Joplin mines further reducing ore to \$32 a ton late last week. Offerings at that figure were unlimited and smelters took advantage by making extensive bookings. Sales for the week totaled 4000 tons, whereas production was practically unchanged at 6200 tons. Shipments aggregated 5750 tons, and visible stocks were reduced to a new low level of 8400 tons.

## Tin

A holiday lull has been in evidence in the domestic market, and only negligible bookings of Straits and English brands have been made during the past week. Offerings for Straits were nominally set at 45.50c. a lb. today. No reaction to the extremely favorable August world statistics was apparent here, and, on the contrary, several operators believe the stock reduction is not genuine inasmuch as considerable tin has recently been stored in non-reporting warehouses. Pool holdings will be liquidated by December if the scheduled releases continue, but Continental opinion is that a sizable tonnage will be withheld so that the restriction agreement will continue operative. English sources contend that a tin shortage may develop before the end of the year if quota restrictions are not eased. Scattered Continental sales were made during the week at firm price levels.

## Lead

A moderate, well diversified demand has enabled sellers to more than move their daily intake. Quotations are holding very firm, and are unchanged at 4.50c. a lb., New York, and 4.35c., St. Louis. Consumers are limiting buying activity to cover their daily needs, and are awaiting more reliable developments of the recovery act before making extended future commitments. Although producers have opened October books at current price levels, only negligible orders have been placed for that month, and despite a moderate August carry-over there is every indication that consumers' September requirements remain less than 75 per cent covered. Contract releases are being received in unabated volume, and there is no indication that the metal is going to stock piles. Smelters estimate that August shipments will deplete stocks more than 5000 tons, and thereby further improve the lead statistical position which is even now comparatively satisfactory.

## Copper Averages

The average price of Lake copper for August, based on daily quotations in THE IRON AGE, was 9c. a lb., delivered New York. The average price of electrolytic copper for that month was 8.75c., refinery, or 9c. a lb., delivered Connecticut.

### The Week's Prices. Cents Per Pound for Early Delivery

	Aug. 30	Aug. 31	Sept. 1	Sept. 2	Sept. 5	Sept. 6
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, New York	9.00	9.00	9.00	9.00	9.00	9.00
Straits tin, Spot, N. Y.	45.62½	45.65	45.60	45.87½	45.50	45.50
Zinc, East St. Louis	4.70	4.70	4.70	4.70	4.70	4.70
Zinc, New York	5.07	5.07	5.07	5.07	5.07	5.07
Lead, St. Louis	4.35	4.35	4.35	4.35	4.35	4.35
Lead, New York	4.50	4.50	4.50	4.50	4.50	4.50

\*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.

Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.

Antimony, 6.87½c. a lb., New York.

Brass ingots, 85-5-5-5, 9c. a lb., New York and Philadelphia.

### From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	47.25c. to 48.25c.
Tin, bar	49.25c. to 50.25c.
Copper, Lake	10.50c. to 11.25c.
Copper, electrolytic	10.25c. to 10.75c.
Copper, castings	10.00c. to 11.00c.
*Copper sheets, hot-rolled	17.12½c.
*High brass sheets	14.75c.
*Seamless brass tubes	16.37½c.
*Seamless copper tubes	16.62½c.
*Brass rods	12.25c.
Zinc, slabs	6.00c. to 7.00c.
Zinc sheets (No. 9), casks	9.75c. to 10.00c.
Lead, American pig	5.50c. to 6.50c.
Lead, bar	7.00c. to 8.00c.
Lead, sheets	8.25c.
Antimony, Asiatic	8.50c. to 9.50c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	30.00c. to 31.00c.
Babbitt metal commercial grade	25.00c. to 50.00c.

\*These prices are also for delivery from Chicago and Cleveland warehouses.

### From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	49.00c.
Tin, bar	51.00c.

Copper, Lake	10.25c.
Copper, electrolytic	10.25c.
Copper, casting	10.00c.
Zinc, slab	6.00c. to 6.25c.
Lead, American pig	5.35½c. to 5.50c.
Lead, bar	8.50c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	19.00c.
Babbitt metal, high grade	53.00c.
Solder, ½ and ½	28.25c.

### Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.00c.	8.00c.
Copper, hvy. and wire	6.75c.	7.75c.
Copper, light and bottoms	5.75c.	6.25c.
Brass, heavy	3.75c.	4.50c.
Brass, light	3.50c.	3.75c.
Hvy. machine composition	5.25c.	6.00c.
No. 1 yel. brass turnings	5.00c.	5.625c.
No. 1 red brass or compos. turnings	5.00c.	5.50c.
Lead, heavy	3.625c.	4.00c.
Zinc	2.75c.	3.25c.
Cast aluminum	7.50c.	8.75c.
Sheet aluminum	12.00c.	13.50c.

# Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

## BARS, PLATES, SHAPES

### Iron and Steel Bars

#### Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.65c.
Del'd Philadelphia	1.91c.
Del'd New York	1.95c.
F.o.b. Cleveland	1.65c.
F.o.b. Buffalo	1.70c.
F.o.b. Birmingham	1.75c.
C.I.F. Pacific ports	2.15c.

#### Billet Steel Reinforcing

(Stock lengths as quoted by distributors)

F.o.b. P'gh mills	1.80c.
F.o.b. Birmingham	1.85c.
F.o.b. Buffalo	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Youngstown	1.85c.
F.o.b. Chicago or Gary	1.85c.

#### Rail Steel

F.o.b. mills, east of Chicago dist.	1.75c.
F.o.b. Chicago (to merchant trade)	1.55c.
F.o.b. Chicago (quoted by distributors)	1.80c.

#### Iron

Common iron, f.o.b. Chicago	1.60c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	1.86c.
Common iron, del'd New York	1.90c.

#### Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.65c.
F.o.b. Birmingham	1.75c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.7935c.
F.o.b. Coatesville	1.70c.
F.o.b. Sparrows Point	1.70c.
Del'd New York	1.898c.
C.I.F. Pacific ports	2.15c.
Wrought iron plates, f.o.b. P'gh	3.00c.

#### Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.60c.
F.o.b. Chicago	1.65c.
F.o.b. Birmingham	1.75c.
F.o.b. Bethlehem	1.70c.
Del'd Cleveland	1.8035c.
Del'd Philadelphia	1.8155c.
Del'd New York	1.86775c.
C.I.F. Pacific ports (standard)	2.15c.
C.I.F. Pacific ports (wide flange)	2.35c.

#### Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago mill	2.00c.
F.o.b. Buffalo	2.00c.

#### Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)	
Alloy Quantity Bar Base	2.45c. per lb.
S.A.E. Series	
Numbers	Differential per 100 Lb.
2000 (1/4% Nickel)	\$0.25
2100 (2/4% Nickel)	0.55
2300 (3/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flat)	0.25
Rounds and Square	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars forging quality. The differential for cold-drawn bars is 4c. a lb. higher, with standard classification for cold-finish alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2 1/2 in. thick, regardless of sectional area, take the bar price.

#### Cold Finished Bars\*

Bars, f.o.b. Pittsburgh Mill	1.95c.
Bars, f.o.b. Chicago	2c.
Bars, Cleveland	2c.
Bars, Buffalo	2c.
Bars, Detroit	2.15c.
Bars, eastern Michigan	2.20c.
Shafting, ground, f.o.b. mill	1 1/4 in. 3.25c.
	1-3/16 to 1 1/2 in. 2.75c.
	1-9/16 to 1 1/4 in. 2.60c.
	1-15/16 to 2 1/4 in. 2.45c.
	2-15/16 to 6 in. 2.30c.

\* In quantities of 10,000 to 19,999 lb.

## SHEETS, STRIP, TIN PLATE TERNE PLATE

### Sheets

#### Hot Rolled

No. 10, f.o.b. Pittsburgh	1.65c.
No. 10 f.o.b. Gary	1.75c.
No. 10, del'd Philadelphia	1.96c.
No. 10, f.o.b. Birmingham	1.80c.
No. 10, c.I.F. Pacific Coast ports	2.27 1/2 c.

#### Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.25c.
No. 24 f.o.b. Gary	2.35c.
No. 24, del'd Philadelphia	2.56c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, c.I.F. Pacific Coast ports	2.90c.
No. 24, wrought iron, Pittsburgh	4.30c.

#### Heavy Cold-Rolled

No. 10 gage, f.o.b. Pitts'h	2.30c.
No. 10 gage, f.o.b. Gary	2.40c.
No. 10 gage, del'd Phila.	2.61c.
No. 10 gage, del'd Pacific Coast ports	3.05c.

#### Light Cold-Rolled

No. 20 gage, f.o.b. Pitts'h	2.75c.
No. 20 gage, f.o.b. Gary	2.85c.
No. 20 gage, del'd Phila.	3.06c.
No. 20 gage, del'd Pacific Coast ports	4.30c.

#### Fender Stock

No. 20, Pittsburgh or Cleveland	2.95c.
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#### Galvanized Sheets

No. 24, f.o.b. Pittsburgh	2.85c.
No. 24, f.o.b. Gary	2.95c.
No. 24, del'd Philadelphia	3.16c.
No. 24, f.o.b. Birmingham	3.00c.
No. 24, c.I.F. Pacific Coast ports	3.50c.
No. 24, wrought iron, Pittsburgh	4.95c.

#### Long Terme

No. 24, unassorted, 8-lb. coating	
f.o.b. Pittsburgh	2.90c.

#### Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	2.90c.
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#### Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.50c.
No. 28, Gary	2.60c.

#### Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mill	\$4.65
Standard cokes, f.o.b. Gary	4.75

#### Terne Plate

(F.o.b. Morgantown or Pittsburgh)	
(Per Package, 20 x 28 in.)	

8-lb. coating I.C.	\$8.70
15-lb. coating I.C.	11.00
20-lb. coating I.C.	11.90
25-lb. coating I.C.	13.00
30-lb. coating I.C.	13.80
40-lb. coating I.C.	15.30

#### Hot-Rolled Hoops, Bands, Strips and Flats under 3/4 in.

	Base per Lb.
All widths up to 24 in., Pittsburgh	1.65c.
All widths up to 24 in., Chicago	1.75c.
Cooperage stock, Pittsburgh	1.75c.
Cooperage stock, Chicago	1.80c.

#### Cold-Rolled Strips

F.o.b. Pittsburgh	2.25c.
F.o.b. Cleveland	2.25c.
Del'd Chicago	2.55c.
F.o.b. Worcester	2.45c.

## WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

	Per Lb.
Bright wire	2.10c.
Spring wire	3.10c.

#### To Jobbing Trade

Extras of 10c. a 100 lb. on mixed carloads, 20c. on joint carloads and 30c. on pooled cars and less-than-carload lots are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

#### Base per Keg

Standard wire nails	\$2.10
Smoothed coated nails	2.10
Galvanized nails	3.60

#### Base per 100 Lb.

Smooth annealed wire	\$2.25
Smooth galvanized wire	2.60
Polished staples	2.80
Galvanized staples	3.05
Barbed wire, galvanized	2.60
Woven wire fence, base column	55.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$5 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

## STEEL AND WROUGHT PIPE AND TUBING

### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

#### Butt Weld

Steel	Black Galv.	Wrought Iron	Black Galv.
Inches		Inches	
1/2 to 3/4	51 1/2	1/2 to 3/4	91 1/2 + 13 1/2
3/4 to 1	57	3/4 to 1	97 1/2 + 13 1/2
1 to 1 1/4	62	1 to 1 1/4	103 1/2 + 13 1/2
1 1/4 to 2	65 1/2	1 1/4 to 2	106 1/2 + 13 1/2
2 to 3	67 1/2	2 to 3	108 1/2 + 13 1/2
3 to 4	68 1/2	3 to 4	109 1/2 + 13 1/2
4 to 6	69 1/2	4 to 6	110 1/2 + 13 1/2
6 to 8	70 1/2	6 to 8	111 1/2 + 13 1/2
8 to 10	71 1/2	8 to 10	112 1/2 + 13 1/2
10 to 12	72 1/2	10 to 12	113 1/2 + 13 1/2

#### Lap Weld

2 to 3	63 1/2	2 to 3	37	22 1/2
3 to 4	65 1/2	3 to 4	37 1/2	22 1/2
4 to 6	68 1/2	4 to 6	38	22 1/2
6 to 8	67 1/2	6 to 8	38	24 1/2
8 to 10	67 1/2	8 to 10	37	24 1/2
10 to 12	66	10 to 12	36	24 1/2

#### Butt Weld, extra strong, plain ends

1/2 to 3/4	48 1/2	3/4 to 1	48 1/2	+ 13	+ 45 1/2
3/4 to 1	54 1/2	1 to 1 1/4	54 1/2	+ 13	+ 45 1/2
1 to 1 1/4	60	1 1/4 to 2	60	+ 13	+ 45 1/2
1 1/4 to 2	64 1/2	2 to 3	64 1/2	+ 13	+ 45 1/2
2 to 3	66 1/2	3 to 4	66 1/2	+ 13	+ 45 1/2

#### Lap Weld, extra strong, plain ends

2 to 3	61 1/2	2 to 3	40	26
3 to 4	63 1/2	3 to 4	40	26
4 to 6	69	4 to 6	45 1/2	33
6 to 8	68	6 to 8	45 1/2	33 1/2
8 to 10	68	8 to 10	46	33
10 to 12	67	10 to 12	41 1/2	30

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billings being from the point producing the lowest price to destination.

### Boiler Tubes

#### Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2 1/2	1 1/2 in. .... 1
3 in. .... 33	1 3/4 in. .... 8
2 1/2 in.—2 3/4 in. 40	2 in.—2 1/4 in. 13
3 in.—4 in. 47	2 1/4 in.—2 3/4 in. 16
4 in.—4 1/2 in. 50	3 in. .... 17
4 1/2 in. .... 52	3 1/2 in. to 3 3/4
4 1/2 in. to 6 in. 42	4 in. .... 18
	4 1/2 in. .... 20
	4 3/4 in. .... 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

#### Standard Commercial Seamless Boiler Tubes

Cold-Drawn	Hot Rolled
1 in. .... 61	3 in. .... 41
1 1/4 to 1 1/2 in. 53	3 1/2 to 3 3/4 in. 44
1 1/2 in. .... 37	4 in. .... 46
2 to 2 1/4 in. 27	4 1/2, 5 and 6 in. 36
2 1/4 to 2 3/4 in. 34	

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb. base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

#### Seamless Mechanical Tubing

Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads) 55
Carbon, 0.30% to 40% base (carloads) 50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

## RAILS AND TRACK SUPPLIES

### Rails

	Per Gross Ton
Standard, f.o.b. mill	\$40.00
Light (from billets), f.o.b. mill	38.00
Light (from rail steel), f.o.b. mill	28.00

### Track Equipment

	Base per 100 Lb.
Spikes, 9/16 in. and larger	\$2.4
Spikes, 1/2 in. and smaller	2.0
Spikes, boat and barge	2.0
Tie plates, steel	1.0
Angle bars	1.5
Track bolts, to steam railroads	3.0
Track bolts, to jobbers, all sizes (per 100 count)	73 per cent off list

## BOLTS, NUTS, RIVETS AND SET SCREWS

### Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	72 1/2, 25 and 10
Carriage bolts	72 1/2, 25 and 10
Lag bolts	72 1/2, 25 and 10
Pin bolts, Nos. 1, 2, 3 and 7 heads	72 1/2, 25 and 10
Hot-pressed nuts, blank or tapped, square	72 1/2, 25 and 10
Hot-pressed nuts, blank or tapped, hexagons	72 1/2, 25 and 10
C.p.c. and t. square or hex nuts, blank or tapped	72 1/2, 25 and 10
Semi-finished hexagon nuts	72 1/2, 25 and 10
Semi-finished hexagon castellated nuts, S.A.E.	72 1/2, 25 and 10
Store bolts in packages, P'gh	72 1/2, 25 and 10
Store bolts in packages, Ch'go	72 1/2, 25 and 10
Store bolts in packages, Cleveland	72 1/2, 25 and 10
Store bolts in bulk, P'gh	72 1/2, 25 and 10
Store bolts in bulk, Chicago	72 1/2, 25 and 10
Store bolts in bulk, Cleveland	72 1/2, 25 and 10
Tire bolts	72 1/2, 25 and 10

### Large Rivets

(1/2 in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$1.0
F.o.b. Chicago	1.0

### Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 1
F.o.b. Cleveland	70, 10 and 1
F.o.b. Chi'o and Birm'g'm	70, 10 and 1

### Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screw, 1 in. dia. and smaller	75 and 10
Milled standard set screws, case hard	75 and 10
Milled standard set screws, cut thread	75 and 10
Milled headless set screws, cut thread	75 and 10
1/2 in. and smaller, U.S.S.	75 and 10
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. dia. and smaller	65 and 10
Upset set screws, sq. head	75 and 10
Milled studs	75 and 10

## SEMI-FINISHED STEEL

### Billets, Blooms and Slabs

	Per Gross Ton
Rolling, 4-in. to 9-in. inclusive	\$20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00
Rolling, 4-in. to 9-in. inclusive	20.00

### Sheet Bars

UPPLIES

Gross Ton  
mill. 30.00  
mill. 28.00

per 100 lb.

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**Skelp**  
(F.o.b. Pittsburgh, Youngstown, Chicago, Buffalo, Coatsville, Pa., or Sparrows Point Md.)

	Per Lb.
Grooved .....	1.60c.
Universal .....	1.60c.
Sheared .....	1.60c.

#### Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh .....	\$35.00
Cleveland .....	35.00
Chicago .....	36.00
Birmingham .....	38.00
Youngstown (del'd) .....	39.00

#### COKE, COAL AND FUEL OIL

##### Coke

	Per Net Ton
Furnace, f.o.b. Connellsville	
Prompt .....	\$2.50 to \$2.75
Foundry, f.o.b. Connellsville	
Prompt .....	3.25 to 4.50
Foundry, by-product, Chicago ovens, for delivery outside switching districts .....	8.00
Foundry, by-product, delivered in Chicago switching district .....	8.75
Foundry, by-product, New England, delivered .....	10.00
Foundry, by-product, Newark or Jersey City, del'd .....	8.20 to 8.81
Foundry, by-product, Phila. .....	8.50
Foundry, by-product, Cleveland, delivered .....	8.76
Foundry, Birmingham .....	5.00
Foundry, by-product, St. Louis, f.o.b. ovens .....	8.00
Foundry, by-product, del'd St. Louis .....	9.00

##### Coal (Nominal)

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines .....	\$1.50 to \$2.00
Mine run coking coal f.o.b. W. Pa. .....	1.75 to 2.25
Gas coal, 1/2-in., f.o.b. Pa. mines .....	2.00 to 2.50
Mine run gas coal, f.o.b. Pa. mines .....	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines .....	85c. to 1.00
Gas slack, f.o.b. W. Pa. mines .....	1.00 to 1.25

##### Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate .....	4.00c.
No. 4 industrial .....	3.50c.
	Per Gal. f.o.b. Baltimore
No. 3 distillate .....	4.00c.
No. 4 industrial .....	3.50c.
	Per Gal. del'd Chicago
No. 3 industrial fuel oil .....	3.73c.
No. 5 industrial fuel oil .....	3.23c.
	Per Gal. f.o.b. Cleveland
No. 3 distillate .....	5.50c.
No. 4 industrial .....	5.00c.

#### REFRACTORIES

##### Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat Intermediate Duty Brick	
Duty Brick	
Pennsylvania .....	\$45.00
Maryland .....	45.00
New Jersey .....	45.00
Ohio .....	45.00
Kentucky .....	45.00
Missouri .....	45.00
Illinois .....	45.00
Ground fire clay, per ton .....	7.00

##### Chrome Brick

	Per Net Ton
Standard size .....	\$45.00

##### Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania .....	\$45.00
Chicago .....	45.00
Birmingham .....	55.00
Silica clay, per ton .....	8.00

##### Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa. .....	\$65.00
Unburned, f.o.b. Baltimore .....	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa. .....	40.00
Domestic, f.o.b. Chewelah, Wash. .....	22.00

#### CAST IRON PIPE

	Per Net Ton
4-in. and larger, del'd Chicago .....	\$43.40 to \$44.40
4-in., del'd Chicago .....	46.40 to 47.40
4-in., and larger, del'd New York .....	38.30
4-in., del'd New York .....	41.30
4-in., and larger, Birmingham .....	\$35.00 to \$40.00
4-in., Birmingham .....	38.00 to 39.00
Class "A" and gas pipe, \$3 extra.	

#### VALLEY

Per Gross ton f.o.b. Valley furnace:

Basic .....	\$17.00
Bessemer .....	18.00
Gray forge .....	17.50
No. 2 foundry .....	17.50
No. 3 foundry .....	17.00
Malleable .....	17.50
Low phos., copper free .....	25.00

Freight rate to Pittsburgh or Cleveland district, \$1.89.

#### PITTSBURGH

Per gross ton, f.o.b. Neville Island:

Basic .....	\$17.50
No. 2 foundry .....	18.00
No. 3 foundry .....	17.50
Malleable .....	18.00
Bessemer .....	18.50

Freight rates to points in Pittsburgh district range from 69c. to \$1.26.

#### CHICAGO

Per gross ton at Chicago furnaces:

N't'n No. 2 fdy. ....	\$17.50
N't'n No. 1 fdy. ....	18.00
Malleable, not over 2.25 sil. ....	17.50
High phosphorus .....	17.50
Bessemer .....	18.00
Basic .....	17.00
Lake Super. charcoal, sil. 1.50, by rail .....	23.67
Southern No. 2 fdy. ....	\$16.14 to 17.14
Low, phos., sil. 1 to 2, copper free .....	25.00
Silvery, sil. 8 per cent .....	29.17
Bess. ferro-sil., 15 per cent .....	38.67

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnaces, not including a switching charge.

#### ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill. ....	\$17.50
Malleable, f.o.b. Granite City .....	18.00
Southern fdy., sil. 1.75 to 2.25 del'd St. Louis, 35c. a ton less than Granite City iron .....	

Freight rates, actual freight rate, plus surcharge, Granite City to St. Louis: \$2.30 from Chicago; \$4.56 from Birmingham.

#### NEW YORK

Per Gross ton, delivered New York district:

"Buffalo, No. 2, del'd .....	\$19.02 to \$20.02
"Buffalo malleable, del'd .....	
eastern N. J. ....	19.52 to 20.52
East Pa. No. 2 fdy, del'd .....	
eastern N. J. ....	19.02 to 19.52

Freight rates: \$1.52 to \$2.63 from eastern Pennsylvania.

#### BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy. ....	\$17.50
Malleable, sil. up to 2.25 .....	18.00
Basic .....	16.50
Lake Superior charcoal del'd .....	23.91

\*Each increase of 25 points of silicon above base foundry grade takes 25c. extra.

#### CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25 .....	\$18.23
Tenn. fdy., sil. 1.75 to 2.25 .....	18.23
N't'n No. 2 foundry .....	18.63
S't'n Ohio silvery, 8% .....	26.14

Freight rates, \$1.89 from Ironton and Jackson, Ohio; \$3.82 from Birmingham

#### CLEVELAND

Per gross ton at Cleveland furnace:

N't'n No. 2 fdy. ....	\$17.50
Malleable .....	17.50
Ohio silvery, 8 per cent .....	27.37
Stand. low phos., Valley .....	25.00
Southern No. 2 fdy. ....	17.14

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 63c. average local switching charge; \$3.12 from Jackson, Ohio; \$6.14 from Birmingham.

#### PHILADELPHIA

Per gross ton at Philadelphia:

*East. Pa. No. 2 .....	\$18.34
Basic (del'd east Pa.) .....	17.84
Malleable .....	18.84
Stand. low phos. (f.o.b. east. Pa. furnace) .....	22.00
Con. b'g low phos. (f.o.b. furnace) .....	22.00

Prices, except as specified otherwise, are del'd Philadelphia. Freight rates \$4c. to \$1.79 from eastern Pennsylvania furnaces.

\*Each increase of 25 points of silicon above base grade takes 25c. extra.

#### BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil. ....	\$13.50
Basic .....	13.50

#### NEW ENGLAND

Per gross ton delivered Boston and nearby New England points:

Mystic, sil. 1.75 to 2.25 .....	\$19.50
Buffalo, sil. 1.75 to 2.25 .....	19.50
Ala., sil. 1.75 to 2.25 .....	19.12

#### CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75 .....	\$21.00
No. 2 fdy., sil. 1.75 to 2.75 .....	20.50
Malleable .....	21.00
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75 .....	\$22.50
No. 2 fdy., sil. 1.75 to 2.25 .....	22.00
Malleable .....	22.50
Basic .....	22.00

#### Ferromanganese

Domestic, 80%, seaboard, Per Gross Ton (carloads) .....

Domestic, 80%, seaboard, (less carloads) .....	\$82.00
Domestic, 80%, seaboard, (less carloads) .....	89.00

#### Spiegeleisen

Domestic, 19 to 21% Per Gross Ton Furnace (carloads) .....

Domestic, 19 to 21% (carloads) .....	\$27.00
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#### Electric Ferro-silicon

Per Gross Ton Delivered

50% (carloads) .....	\$74.50
50% (less carloads) .....	82.00
75% (carloads) .....	120.00
75% (less carloads) .....	130.00
14% to 16% (f.o.b.) Welland .....	31.00
Ont. (in carloads) .....	36.00
14% to 18% (less carloads) .....	36.00

#### Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
6% .....	\$22.25	12% .....	\$29.25
7% .....	23.25	13% .....	30.75
8% .....	24.25	14% .....	32.25
9% .....	25.25	15% .....	33.75
10% .....	26.25	16% .....	35.25
11% .....	27.25	17% .....	36.75

Bessemer Ferro-silicon

F.o.b. Jackson County, Ohio, Furnace

	Per Gross Ton		Per Gross Ton
10% .....	\$26.25	14% .....	\$32.25
11% .....	27.75	15% .....	33.75
12% .....	29.25	16% .....	35.25
13% .....	30.75	17% .....	36.75

Manganese 1 1/2 to 3%. \$1 a ton additional. For each ton of manganese over 3% \$1 a ton additional. Phosphorus 0.65% or over, \$1 a ton additional.

#### Other Ferroalloys

Ferrotungsten, per lb. of del. car-

loads .....	94c.
Ferrotungsten, less carloads .....	\$1.00
Ferromanganese, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in car-	
loads .....	9.50c.
Ferromanganese, 2% car-	
bon .....	16.50c. to 17.00c.
Ferromanganese, 1% car-	
bon .....	17.50c. to 18.00c.
Ferromanganese, 0.10% carbon .....	19.50c. to 20.00c.
Ferromanganese, 0.06% carbon .....	20.00c. to 20.50c.
Ferromanganese, del., per lb. contained Va. ....	\$2.60 to 2.80

## Iron and Steel Scrap

#### PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel .....	\$13.00 to \$13.50
No. 2 heavy melting steel .....	11.50 to 12.00
No. 3 railroad wrought .....	13.00 to 13.50
Scrap rails .....	13.00 to 13.50
Rails 3 ft. and under .....	19.50 to 19.00
Sheet bar crops, ordinary .....	14.00 to 14.50
Compressed sheet steel .....	12.75 to 13.25
Hand bundled sheet steel .....	11.75 to 12.25
Hvy. steel axle turnings .....	12.00 to 12.50
Machine shop turnings .....	10.50 to 11.00
Short shop steel turnings .....	10.50 to 11.00
Short mixed borings and turnings .....	9.50 to 10.00
Cast iron borings .....	9.50 to 10.00
Cast iron car wheels .....	12.50 to 13.00
Heavy breakable cast .....	10.25 to 10.75
No. 1 cast .....	11.50 to 12.00
Rail. knuckles and coup- lers .....	15.00 to 15.50
Rail. coil and leaf springs .....	15.00 to 15.50
Rolled steel wheels .....	15.00 to 15.50
Low phos. billet crops .....	16.00 to 16.50
Low phos. sheet bar crops .....	15.50 to 16.00
Low phos. plate scrap .....	15.00 to 15.50
Low phos. punchings .....	15.50 to 16.00
Steel car axles .....	18.00 to 18.50

#### CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel .....	\$10.00
Shoveling steel .....	10.00

Ferrocobaltitium, 15 to 18% per

net ton, f.o.b. furnace in car-

loads .....

Ferrophosphorus, electric, or blast

furnace material, in carloads, 18%, Rockdale, Tenn., base, per

gross ton with \$2 unitage .....

Ferrophosphorus, electric, 24% f.o.b.

Anniston, Ala., per gross ton with

\$2.75 unitage .....

Perromolybdenum, per lb. Mo., del.

Calcium molybdate, per lb. Mo., del.

Silico spiegel, per ton, f.o.b. fur-

nace, car lots .....

Ton lots or less, per ton .....

Silico-manganese, gross ton, deliv-

ered: .....

2.50% carbon grade .....

3% carbon grade .....

1% carbon grade .....

Spot prices .....

#### Ores

Lake Superior Ores, Delivered Lower

Lake Ports

Per Gross Ton

Old range, Bessemer, 51.5% iron, \$4.80

Old range, non-Bessemer, 51.5% iron, 4.65

Mesabi Bessemer, 51.5% iron, 4.65

Mesabi non-Bessemer, 51.5% iron, 4.50

High phosphorus, 51.5% iron, 4.40

Foreign Ore, c.i.f. Philadelphia or

Baltimore

No. 2 busheling	\$4.00 to \$4.50
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	4.75 to 5.25
No. 1 machinery cast	10.00 to 10.50
Clean automobile cast	10.00 to 10.50
No. 1 railroad cast	10.00 to 10.50
No. 1 agricultural cast	8.50 to 9.25
Store plate	7.00 to 7.50
Grate bars	6.75 to 7.25
Brake shoes	9.00 to 9.50

#### PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$12.00
No. 2 heavy melting steel	\$10.00 to 10.50
No. 1 railroad wrought	12.00
Bundled sheets	8.50 to 9.00
Hydraulic compressed, new	10.50 to 11.00
Hydraulic compressed, old	8.50 to 9.00
Machine shop turnings	12.50 to 13.00
Heavy axle turnings	10.00 to 10.50
Cast borings	7.00
Heavy breakable cast	10.00 to 10.50
Store plate (steel works)	9.50
No. 1 low phot. heavy	15.00
Couplers and knuckles	14.00
Roller steel wheels	14.00
No. 1 blast furnace	7.00
Spec. iron and steel pipe	10.00 to 10.50
Shafting	15.00 to 15.50
Steel axles	15.00 to 15.50
No. 1 forge fire	10.50
Cast iron carwheels	12.00 to 13.00
No. 1 cast	12.00 to 13.00
Cast borings (chem.)	12.00 to 14.00
Steel rails for rolling	12.00 to 12.50

#### CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$11.00 to \$11.25
No. 2 heavy melting steel	10.50 to 10.75
Compressed sheet steel	10.00 to 10.50
Light bundled sheet stamp-	
ings	6.50 to 7.00
Drop forge flashings	10.00 to 10.50
Machine shop turnings	12.50 to 13.00
Short shoveling turnings	8.00 to 8.50
No. 1 busheling	10.00 to 10.50
Steel axle turnings	7.50 to 8.00
Low phot. billet crops	12.50 to 13.00
Cast iron borings	7.75 to 8.25
Mixed borings and short	
turnings	7.75 to 8.25
No. 2 busheling	11.00 to 11.50
No. 1 cast	11.00 to 11.50
Railroad grate bars	6.50 to 7.00
Store plate	7.50 to 8.00
Roller steel wheels	10.00 to 10.50
Rolls under 3 ft.	10.50 to 11.00
Rails for rolling	10.50 to 11.00
Railroad malleable	10.00 to 11.00
Cast iron carwheels	11.00

#### BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$10.50 to \$11.00
No. 2 heavy melting scrap	10.00 to 10.50
Scrap rails	8.75 to 9.25
New hydraulic comp. sheets	10.00 to 10.50
Old hydraulic comp. sheets	9.50 to 10.00
Drop forge flashings	10.00 to 10.50
No. 1 busheling	10.00 to 10.50
Hvy. steel axle turnings	8.50 to 9.00
Machine shop turnings	6.50 to 7.00
Knuckles and couplers	11.50 to 12.00
Coil and leaf springs	11.50 to 12.00
Roller steel wheels	11.50 to 12.00
Low phot. billet crops	12.50 to 13.00
Short shov. steel turnings	7.00 to 7.50
Short mixed borings and	
turnings	7.00 to 7.50
Cast iron borings	6.50 to 7.00
No. 2 busheling	10.00 to 10.50
Steel car axles	11.00 to 12.00
Iron axles	11.00 to 12.00
No. 1 machinery cast	11.25 to 12.25
No. 1 cupola cast	11.00 to 12.00
Store plate	8.75 to 9.25
Steel rails, 3 ft. and under	13.50 to 14.00
Cast iron carwheels	10.00 to 10.50
Industrial malleable	11.50 to 12.00
Railroad malleable	12.00 to 12.50
Chemical borings	7.50 to 8.00

#### BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$11.00
Scrap steel rails	10.00
Short shoveling turnings	5.50
Store plate	7.00 to 7.50
Steel axles	11.00 to 11.50
Iron axles	11.00 to 11.50
No. 1 railroad wrought	7.00 to 7.50
Rails for rolling	11.50
No. 1 cast	10.50
Tramcar wheels	10.00
Cast iron borings, chem.	8.00

#### ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$9.75 to \$10.25
No. 1 heavy melting	9.00 to 9.50
No. 2 heavy melting	8.25 to 8.75
No. 1 locomotive tires	7.50 to 8.00
Misc stand.-sec. rails	10.00 to 10.50
Railroad springs	10.00 to 10.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	9.00 to 9.50
No. 1 busheling	4.75 to 5.25
Cast iron borings and	
shoveling turnings	4.50 to 5.00
Rails for rolling	10.50 to 11.00
Machine shop turnings	4.50 to 5.00
Heavy turnings	4.50 to 5.00
Steel car axles	10.00 to 10.50
Iron car axles	11.00 to 11.50
Wrot. iron bars and trans.	9.00 to 9.50
No. 1 railroad wrought	6.50 to 7.00
Steel rails less than 3 ft.	11.50 to 12.00
Steel angle bars	10.00 to 10.50
Cast iron carwheels	8.50 to 9.00
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	9.00 to 9.50
No. 1 railroad cast	8.50 to 9.00
Store plate	7.00 to 7.50
Relay rails, 60 lb. and	
under	16.00 to 16.50

Relay, rails, 60 lb. and	over	\$20.00 to \$21.00
Agricult. malleable		6.00 to 6.50

#### BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$7.50
Scrap T rails	6.75 to 7.25
Machine shop turnings	4.00 to 4.25
Cast iron borings	4.00 to 4.25
Bundled skeleton, long	5.50 to 6.00
Forge flashings	4.75 to 5.00
Blast furnace scrap	4.75 to 5.00
Shafting	9.00 to 9.50
Steel car axles	8.50 to 9.00
Wrought pipe	3.50 to 4.00
Rails for rolling	8.00 to 8.50
Cast iron borings, chemical	11.00 to 11.50
Per gross ton delivered consumers' yards:	
Textile cast	\$10.00 to \$10.25
No. 1 machinery cast	10.00 to 10.25
Store plate	6.25 to 6.50
Railroad malleable	11.00 to 12.00

#### NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$8.00
No. 2 heavy melting steel	6.50 to 7.00
Unprepared yard iron and	
steel	3.50 to 4.00
No. 1 heavy breakable cast	6.00 to 6.25
Machine shop turnings	3.50
Short shoveling turnings	3.50
Cast borings	4.50 to 4.75
No. 1 blast furnace	3.50 to 4.00
Steel car axles	10.00 to 10.50

Spec. iron and steel pipe	\$4.50 to \$5.00
Forge fire	5.50 to 6.00
No. 1 railroad wrought	6.50 to 7.00
No. 1 yard wrought, long	4.50 to 5.00
Rails for rolling	8.50 to 9.00
No. 1 cast	6.50 to 7.00
No. 2 cast	7.00 to 7.50
Store plate	5.50 to 6.00
Cast borings (chemical)	12.00 to 12.50

Per gross ton, delivered local foundries:	
No. 1 machinery cast	\$11.00
No. 1 hvy. cast (cupola	
size)	9.00
No. 2 cast	8.00

#### CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$9.50 to \$10.00
Scrap rails for melting	9.25 to 9.75
Loose sheet clippings	5.00 to 5.50
Bundled sheets	6.00 to 6.50
Cast iron borings	6.00 to 6.50
Machine shop turnings	5.50 to 6.00
No. 1 busheling	7.00 to 7.50
No. 2 busheling	3.50 to 4.00
Rails for rolling	9.75 to 10.25
No. 1 locomotive tires	8.50 to 9.00
Short rails	11.50 to 12.00
Cast iron carwheels	8.50 to 9.00
No. 1 machinery cast	9.00 to 10.00
No. 1 railroad cast	9.50 to 9.75
Burnt cast	7.00 to 7.50
Store plate	7.00 to 7.50
Agricultural malleable	8.75 to 9.25
Railroad malleable	9.25 to 9.75

#### DETROIT

Dealers' buying prices per gross ton:	
Hvy. melting steel	\$8.75 to \$9.25
Borings and short turnings	6.75 to 7.25
Long turnings	8.00 to 8.50
No. 1 machinery cast	8.50 to 9.00
Automotive cast	10.00 to 10.50
Hydraulic comp. sheets	8.75 to 9.25
Store plate	6.00 to 6.50
New factory busheling	7.75 to 8.25
Old No. 2 busheling	6.75 to 7.25
Sheet clippings	6.00 to 6.50
Flashings	7.00 to 7.50
Low phot. plate scrap	8.75 to 10.25

#### CANADA

Dealers' buying prices per gross ton:	
Toronto Montreal	
Heavy melting steel	\$5.50 \$5.50
Rails, scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 6.00
Axles, wrought iron	4.50 6.50
No. 1 machinery cast	7.75 9.00
Store plate	4.50 5.00
Standard carwheels	7.25 7.00
Malleable	6.75 7.00

## Warehouse Prices for Steel Products

#### PITTSBURGH

Base per Lb.	
Plates	2.85c
Structural shapes	2.85c
Soft steel bars and small shapes	2.60c
Reinforcing steel bars	2.60c
Cold-finished and screw stock	
Rounds and hexagons	3.20c
Squares and flats	3.20c
Hoops and bands, under 1/4 in.	2.95c
Hot-rolled annealed sheets (No. 24)	3.15c
Galv. sheets (No. 24), 25 or more	3.25c
bundles	3.50c
Hot-rolled sheets (No. 10)	2.50c
Galv. corrug. sheets (No. 28), per	
square (more than 3750 lb.)	\$3.32
Spikes, large	2.40c
Small	2.65c
Boat	2.90c
Track bolts, all sizes, per 100 count,	
70 per cent off list.	
Machine bolts, 100 count,	
70 per cent off list.	
Carriage bolts, 100 count,	
70 per cent off list.	
Nuts, all styles, 100 count,	
70 per cent off list.	
Large rivets, base per 100 lb.	\$3.25
Wire, black, soft ann'l'd, base per	
100 lb.	2.90
Wire, galv. ann'l'd, base per 100 lb.	2.90
Common wire nails, per keg	2.45
Cement coated nails, per keg	2.45
On plates, structurals, bars, reinforcing	
bars, bands, hoops and blue annealed	
sheet, base applied to orders of 400 to	
999 lb.	

#### CHICAGO

Base per Lb.	
Plates and structural shapes	3.00c
Soft steel bars	2.75c
Cold-fn. steel bars and shafting	
Rounds and hexagons	3.25c
Flats and squares	3.25c
Bands, 3/16 in. (in Nos. 10 and	
12 gauges)	2.95c
Hoops (No. 14 gauge and lighter)	3.50c
Hot-rolled annealed sheets (No. 24)	3.45c
Galv. sheets (No. 24)	4.10c
Hot-rolled sheets (No. 10)	2.85c
Spikes (3/16 in. and lighter)	3.20c
Track bolts	4.30c
Rivets, structural (keg lots)	3c
Rivets, boiler (keg lots)	3c
Per Cent Off List	
Machine bolts	65
Carriage bolts	65
Cold-fn. steel bars and shafting	65
Hot-pressed nuts, sq., tap, or blank	65
Hot-pressed nuts, hex., tap, or blank	65
Hex. head cap screws	80 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Store bolts	80
Rd. hd. tank rivets, 7/16 in. and	
smaller	65
Wrought washers	\$5.50 off list
No. 8 black ann'l'd wire per 100 lb.	\$3.45
Com. wire nails, base per keg	2.55
Cement c'd nails, base per keg	2.55

#### NEW YORK

Base per lb.	
Plates and struc. shapes	3.10c
Soft steel bars, small shapes	3.10c
Iron bars, swed. charcoal	6.00c to 6.50c
Cold-fn. shafting and screw stock	
Rounds and hexagons	3.79c
Flats and squares	4.29c
Cold-roll, strip, soft and quarter	
hard	4.95c
Hoops	3.30c
Bands	3.30c
Hot-rolled sheets (No. 10)	3.00c
Hot-rolled ann'l'd sheets (No. 24)	3.65c
Galvanized sheets (No. 24)	4.00c
Long term sheets (No. 24)	4.50c
Standard tool steel	12.00c
Wire, black annealed (No. 10)	3.60c
Wire, galv. annealed (No. 10)	4.00c
Tire steel 1/4 x 1/4 in. and larger	3.40c
Smooth finish, 1 to 2 1/4 x 1/4 in.	
and larger	3.75c

Open hearth spring steel, bases	
4.50c. to 7.00c.	
Common wire nails, base, per keg \$2.90	
Machine bolt, cut thread: Off List	
1/2 x 6 in. and smaller, 65 to 65 and 10	
1/2 x 30 in. and smaller, 65 to 65 and 10	
Carriage bolts, cut thread:	
1/2 x 6 in. and smaller, 65 to 65 and 10	
1/2 x 20 in. and smaller, 65 to 65 and 10	
Boiler tubes: Per 100 Ft.	
Lap welded, 2-in.	\$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	36.65
*No. 28 and lighter, 36 in. wide, 20c.	
higher per 100 lb.	

#### ST. LOUIS

Base per Lb.	
Plates and struc. shapes	3.25c
Bars, soft steel or iron	3.00c
Cold-fn. rounds, shafting, screw	
stock	3.61c
Hot-rolled annealed sheets (No. 24)	3.00c
Galv. sheets (No. 24)	4.25c
Hot-rolled sheets (No. 10)	3.10c
Black corrug. sheets (No. 24)	3.65c
Galv. corrug. sheets	4.30c
Structural rivets	3.25c
Boiler rivets	3.25c
Tank rivets, 7/16 in. and smaller:	
100 lb. or more	65
Less than 100 lb.	65
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq. blank or	
tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex. blank or	
tapped, 200 lb. or more	65
Less than 200 lb.	55

#### PHILADELPHIA

Base per Lb.	
*Plates, 1/4-in. and heavier	2.60c
*Structural shapes	2.60c
*Soft steel bars, small shapes, iron	
bars (except bands)	2.60c
Reinforc. steel bars, sq., twist and	
deform	2.30c
Cold-finished steel bars	3.60c
*Steel hoops	3.15c
*Steel bands, No. 12 to 3/16 in.,	
incl.	2.90c
Spring steel	3.30c
Hot-rolled annealed sheets (No. 24)	3.30c
Galvanized sheets (No. 24)	3.75c
*Hot-rolled annealed sheets (No.	
10)	2.75c
Diam. pat. floor plates, 1/4 in.	4.35c
Swedish iron bars	6.00c
These prices are subject to quantity dif-	
ferentials except on reinforcing and Swed-	
ish iron bars.	
*Base prices subject to deductions on	
orders aggregating 4000 lb. or over.	
†For 50 bundles or over.	

#### CLEVELAND

	Base per Lb.
Plates and struc. shapes .....	2.85c
Soft steel bars .....	2.75c
Reinforc. steel bars .....	1.75c. to 2.35c
Cold-fn. steel bars:	
Rounds, squares, hexagons .....	3.25c
Flats .....	3.40c
Flat rolled steel under ¼ in. ....	3.00c
Cold-finished strip .....	3.55c
Hot-rolled annealed sheets (No. 24) ..	3.25c
Galvanized sheets (No. 24) .....	3.50c
Eli-rolled sheets (No. 10) .....	2.75c
Black and n'd wire, per 100 lb. ....	2.20c
No. 9 galv. wire, per 100 lb. ....	2.20c
Com. wire nails, base per keg. ....	2.00c

# World Output of Electric Steel Has Fallen Off Only Moderately

**P**RODUCTION of electric steel by the leading steel producing nations of the world has been only moderately influenced by the depression, according to statistics collected by the National Federation of Iron and Steel Manufacturers, London, England. World output in 1931 was 1,252,700 tons as compared with 1,490,200 tons in 1930 and with 1,883,300 tons in 1929, the peak for all

World Production of Electric Steel by Countries in Tons				
Country	1931	1930	1929	1913
United Kingdom	55,300	76,000	86,800	22,000 (1915)
United States	410,942	612,599	951,431	30,180
France	159,056	153,688	151,001	21,124
Saar	?	?	?	13,649
Germany	130,701	149,081	209,277	88,881
Belgium	?	17,550	15,130	.....
Luxemburg	2,833	3,983	9,962	.....
Japan	?	62,140	52,797	4,329 (1918)
Italy	?	?	211,087	36,948 (1917)
Poland	14,894	14,207	18,317	16,187
Sweden	115,967	116,396	112,702	2,276
Canada	42,502	48,563	52,761	449
Total (Actual Reported)	930,195	1,254,207	1,871,265	172,746
Total (Estimated)	1,252,695	1,490,207	1,883,265	172,746

time. Figures for 1932 are not yet available. In 1913 10 countries produced only 172,750 tons. These totals include estimates for one or two countries, and are given in the accompanying table.

Thus, 1930 production represents a

20.7 per cent decline from the peak output of 1929 and the 1931 total was only 33.5 per cent under the high. World output of all steel in 1930 dropped 21 per cent from the 1929 high and showed a decrease of 42 per cent from that figure in 1931.

## Steel Beer Kegs Are Being Drawn by This Press

**T**HE steel beer keg is rapidly passing out of the experimental stage. This 1200-ton drawing press, specially

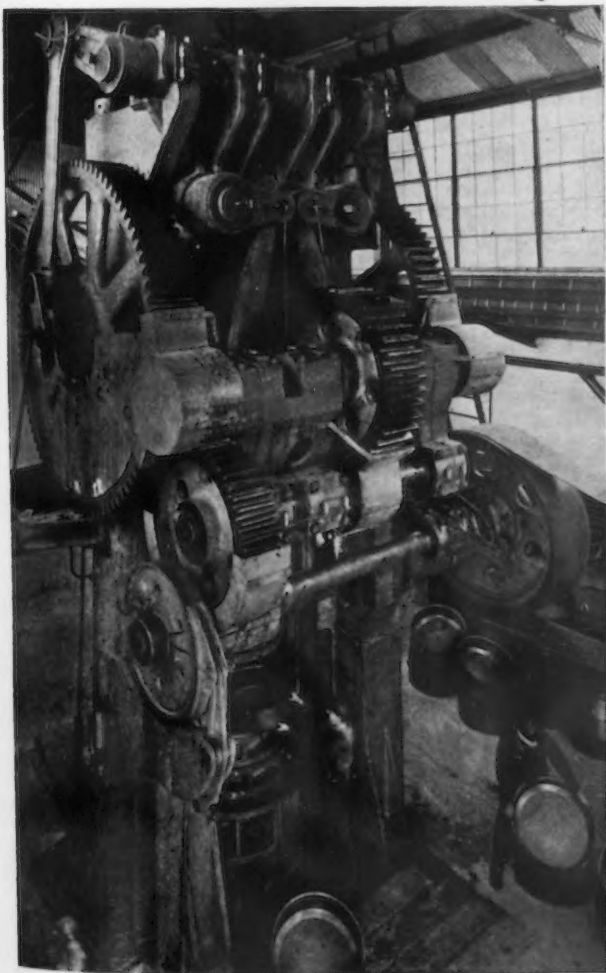
built by the Toledo Machine & Tool Co. for Lalance & Grosjean Mfg. Co., Woodhaven, N. Y., is designed to

draw 68-in. high chrome-nickel steel or ordinary steel sheets into kegs. Two types of kegs have been developed for production on this press, one all rustless steel, the other of ordinary heavy steel sheets, pitch lined. Both types are being tested in actual service by brewers.

For the rustless steel keg a No. 16 gage sheet is sufficiently heavy, while the ordinary steel kegs with pitch lining are drawn from considerably heavier material. The press is currently engaged in drawing large mixing bowls and 5-gal. milk cans, for which No. 16 gage Allegheny metal blanks, 44 in. in diameter, are required.

## Finds Titanium Improves Structural Steel

Titanium improves the elastic limit and tensile strength of plain structural steels, according to tests reported in *Stahl und Eisen*, June 8, by J. Arend and M. Lobe, but has no particular influence in the case of alloy steels. An addition of 0.4 per cent titanium was made to two plain carbon steels with 0.1 and 0.25 per cent carbon respectively, and on a chromium steel with 0.7 per cent chromium and a chromium-nickel steel with 0.13 per cent carbon, 0.7 per cent chromium and 3.5 per cent nickel. The steels were made in a basic open-hearth furnace and the charge comprised 2 tons of ingot mold scrap, 7 tons of heavy scrap and 1.5 tons of spiegeleisen. Before tapping, ferromanganese, ferrosilicon and 4.4 lb. (2 kg.) of aluminum were added. The titanium with thermit was placed in a second ladle into which the steel from the first ladle was poured. The total titanium found in the end was 0.18 to 0.43 per cent.



# PLANT EXPANSION AND EQUIPMENT BUYING

## ◀ NEW ENGLAND ▶

**Lombardi Brewing Co.**, Eastern Avenue, Warwick, R. I., has plans for extensions and improvements, including installation of mechanical bottling and other equipment. Cost over \$65,000 with machinery.

**Building Department**, City Hall, Cranston, R. I., plans new one-story equipment storage and distributing building. Cost about \$50,000 with equipment. Shapiro & Ekman, Old Colony Bank Building, Providence, R. I., are architects.

**Advance Products Co.**, Hartford, Conn., has been organized by Arthur Gladstone, 306 Palm Street, capital \$50,000, to manufacture hardware specialties, household utensils, etc.

**Board of School Commissioners**, Alstead, N. H., plans manual training department in new high school. Bids soon asked on general contract. Cost about \$175,000. Starrett & Van Vleck, 393 Seventh Avenue, New York, are architects.

**Harvard Brewing Co.**, Ayer district, Lowell, Mass., Theodore Hoffacker, chairman of board, has approved plans for extensions and improvements in former Harvard brewery, with installation of equipment for yearly capacity of 300,000 bbl., to cost over \$400,000 with machinery. Waldemar Mortensen, 103 Park Avenue, New York, is engineer.

**Harding Metal Co.**, Worcester, Mass., has been organized by David Fisher, 177 Harding Street, and associates, to manufacture metal products.

**Sutton Tool Co.**, Millbury, Mass., has let general contract to Hutchinson & Brunnell, Millbury, for one-story plant unit, to be equipped primarily as forge shop.

## ◀ NORTH ATLANTIC ▶

**American Potash & Chemical Corp.**, 233 Broadway, New York, has authorized new additions to plant at Trona, San Bernardino County, Cal., for manufacture of soda ash, salt cake and allied potash products. Will consist of group of one and three-story units, to be equipped for daily capacity of 100 tons of soda ash and 125 tons of salt cake, with new storage and distribution facilities. Cost over \$1,000,000, of which larger part will be used for equipment purchases. Dwight P. Robinson & Co., Inc., 1401 Arch Street, Philadelphia, and Union Oil Building, Los Angeles, is consulting engineer.

**Atlantic Macaroni Co., Inc.**, 43-82 Vernon Boulevard, Long Island City, plans extensions and improvements, including installation of additional equipment in power house. Cost about \$25,000 with equipment.

**Morris Metal Products Co., Inc.**, Brooklyn, has been organized by Abraham Morris, 1857 West Fifth Street, and associates, to manufacture a line of metal goods.

**Interboro Beverage Corp.**, 165-207 Melrose Street, Brooklyn, has filed plans for new multi-story brew-house and malt storage and distributing building. Cost about \$300,000 with equipment. Shampian & Shampian, 188 Montague Street, are architects. E. M. Blumenkranz is president.

**Berst-Forster-Dixfield Co.**, 410 Lexington Avenue, New York, manufacturer of pulp and wood products, is continuing its expansion program and in addition to extensions at plants at Plattsburg, N. Y., and Cloquet, Minn., previously announced, to cost \$170,000 with equipment, has let general contract to James Leck Co., 211 South Eleventh Street, Minneapolis, for two-story addition to plant at West Peru, Me., 100 x 100 ft., to cost over \$50,000 with equipment. Homan F. Hallock, Oswego, N. Y., is architect and engineer.

**Coxsackie Mfg. Corp.**, Coxsackie, N. Y., has been organized by Henry J. Albright and Joseph F. Scarboro, both of Coxsackie, to manufacture machinery and parts.

**Local Milk Products, Inc.**, 614 West Forty-ninth Street, New York, plans extensions and improvements in three-story power house on West Forty-eighth Street. Cost about \$25,000 with equipment. William H. Fuhrer, 505 Fifth Avenue, is architect.

**Great Lakes Coal & Coke Co.**, 500 Fifth Avenue, New York, has leased land near Ash Street and Newtown Creek, Long Island City, about 110,000 sq. ft., and will use for new storage and distributing plant, to cost over \$30,000 with equipment.

**Zapon-Brevolite Lacquer Co.**, New York and Chicago, is being organized to take over and consolidate Zapon Co., 60 East Forty-second Street, New York, manufacturer of industrial lacquers, etc., a subsidiary of Atlas Powder Co., Wilmington, Del., and Brevolite Lacquer Co., Twentieth Street and Sheridan Road, North Chicago, Ill. Consolidated organization will carry out expansion program, concentrating middle west production at North Chicago, noted. Stamford, Conn., plant of Zapon Co., will be continued in service, as heretofore.

**Figge & Hutwelker Co.**, 627 West Fortieth Street, New York, maker of food products, has filed plans for extensions and improvements in five-story storage and distributing plant, 18-22 Hall Street, Brooklyn. Cost about \$25,000 with equipment. William I. Hohaus, Inc., 17 West Forty-fourth Street, New York, is architect and engineer.

**Continental Can Co.**, 1 Pershing Square, New York, is continuing its expansion program with construction of one-story addition to plant at Houston, Tex., comprising second story to present one-story unit; a third top-story will be built in near future. As previously reported, company has authorized new three-story can-manufacturing plant at Seattle, and two-story factory at San Jose, Cal., entire program to cost over \$600,000 with equipment.

**American Weldery, Inc.**, 267 Richards Avenue, Dover, N. J., has leased new one-story building to be constructed at 275 Richards Avenue, and will occupy for new welding works. Cost about \$24,000 with equipment. J. J. Vreeland & Sons, 16 West Blackwell Street, are architects.

**Bridge Street Machine Shop, Inc.**, Hackensack, N. J., has been organized by Sidney L. Allison, 76 Bridge Street, and associates, capital \$50,000, to operate general machine shop, boiler and tank works.

**Trenton Brass & Machine Co.**, Prospect Street, Trenton, N. J., manufacturer of plumbers' brass goods, etc., has superstructure under way for new three-story addition for machine shop and foundry, replacing in part structure destroyed by fire recently.

**Copper Print Roller Corp.**, Paterson, N. J., has been organized by Gustave Heunig and Joseph R. Brumale, Hart Hill, Grand and Morris Streets, capital \$125,000, to manufacture copper rollers and kindred products for wall paper and oil cloth production.

**Keystone Pipe Line Co.**, Seventy-second Street and Eastwick Avenue, Philadelphia, has acquired property, location noted, for expansion in natural gas service and distribution system.

**International Vegetated Products Corp.**, Philadelphia, has leased former baking plant at 4563-71 Bermuda Street, and will improve and occupy for new oil products plant.



**Ehret Magnesia Mfg. Co.**, Valley Forge, Pa., manufacturer of pipe coverings and kindred mechanical specialties, plans one-story addition. Cost over \$25,000 with equipment. H. M. Wilson Co., Eighteenth and Brandywine Streets, Philadelphia, is engineer.

**Delaware Brewing Co.**, Wilmington, Del., care of Franklin L. Mettler, 832 Market Street, representative, recently organized with capital of \$400,000, plans new plant in vicinity of Newport, Del. Cost over \$125,000 with equipment.

**Hoffman Beverage Co.**, Newark, N. J., has contracted for modern brewery, brew-house equipment for which will be furnished by Blaw-Knox Co., Pittsburgh. In construction of plant, Blaw-Knox engineers are cooperating with Hoffman Company technicians to achieve positive mechanical control of all operations, to insure absolute sterility in every unit.

## ◀ WESTERN PENNA. ▶

**Hillman Coal & Coke Co.**, First National Bank Building, Pittsburgh, plans construction of new river loading tippie on Monongahela River, near Fayette City, Pa., with hoisting, loading and other mechanical equipment. Application has been made for Federal permission.

**Saint Gobain Co., Ltd.**, Paris, France, manufacturer of sheet and plate glass, has organized Franklin Glass Corp., to take over former sheet glass plant of Standard Plate Glass Co., Butler, Pa., acquired recently from receiver. New company will carry out improvement program, including reconditioning and replacement in equipment. Walter Schweppe will be superintendent in charge.

**Tri-State Creosoting & Terminal Corp.**, Kenova, W. Va., plans construction of river terminal on Ohio River at Ceredo, W. Va., including construction of two buildings, with installation of hoisting, conveying, loading and other mechanical equipment. Application has been made for Federal permission.

**Town Council**, Moorefield, W. Va., plans installation of pumping machinery and other mechanical equipment, pipe lines, etc., for extensions and improvements in municipal water system. Cost about \$25,000. C. E. Tauskey, Oak Hill, W. Va., is engineer.

## ◀ OHIO AND INDIANA ▶

**Triplex Screw Co.**, 5317 Grant Avenue, Cleveland, manufacturer of cap screws, bolts, nuts, etc., plans new one-story addition, 90 x 140 ft., to cost about \$45,000 with equipment.

**Harshaw Chemical Co.**, 1945 East Ninety-seventh Street, Cleveland, manufacturer of industrial chemicals, etc., has let general contract to Mark Swisher, 1718 Lakefront Avenue, East Cleveland, for two-story addition to Newburgh plant, 58 x 148 ft., for pigment division, to cost about \$50,000 with equipment.

**Somers Mining Co.**, Cadiz, Ohio, operating Somers coal mine, W. F. Hazen, superintendent, plans new steam-electric power plant for service at properties. Cost about \$70,000 with 1000-kw. generator unit and auxiliary equipment.

**Henderson Tire & Rubber Co.**, Bucyrus, Ohio, now being organized by C. O. Henderson, care of Bucyrus Chamber of Commerce, and associates, is concluding arrangements for acquisition of former local plant of Shunk Mfg. Co. and will remodel and equip for new mill. Machinery will be installed for initial daily output of 1000 tires, in addition to line of rubber specialties.

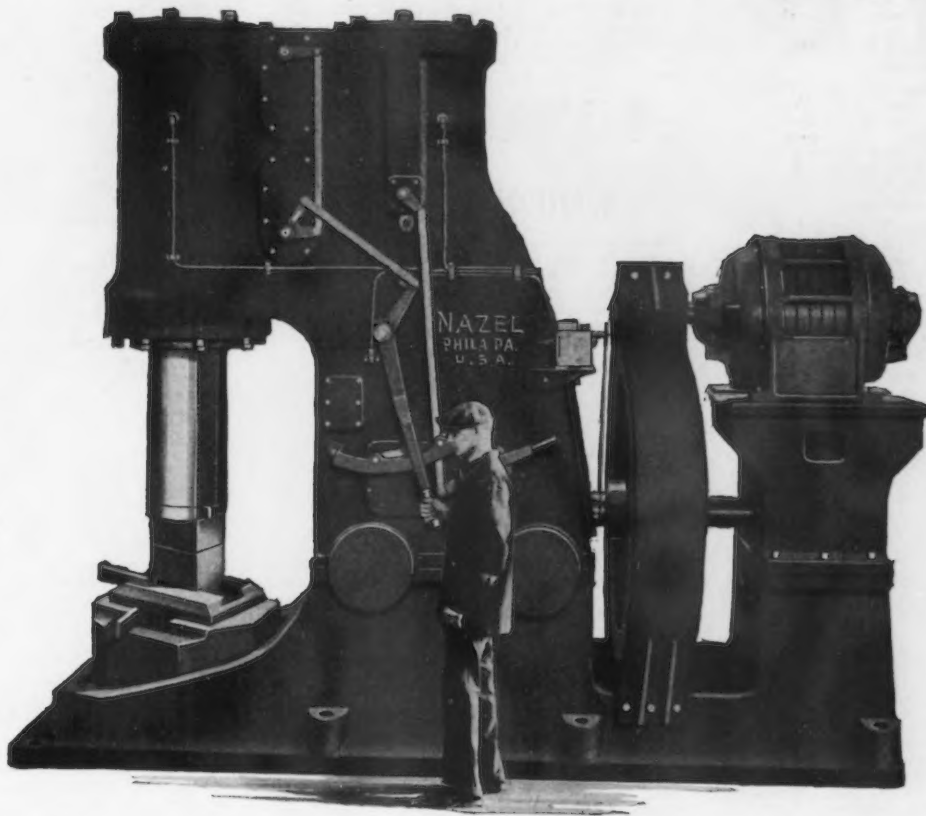
**Arrow Cutlery Co.**, Fremont, Ohio, care of Henry G. Stahl, Stahl Building, has been organized by George E. and Louis E. Lemon, Fremont, to manufacture knives and cutlery products.

**Dayton Rubber Mfg. Co.**, 2345 West River-view Avenue, Dayton, Ohio, is completing surveys for new power plant for mill service. Cost about \$85,000 with equipment. A. M. Kinney, Inc., Carew Tower Building, Cincinnati, is consulting engineer.

**Wedge Protector, Inc.**, 5208 Harvard Avenue, Cleveland, manufacturer of protective devices.

# NAZEL AIR HAMMER

NOTED FOR ITS BLOW & CONTROL



Single and Set Blows from any point in the stroke, in addition to its well-known variable automatic blows by the simple movement of control lever has been incorporated in this new design.

Another feature is the increased clear working space above and around the Anvil block, the space between dies being equal to the full

stroke of the Ram as the Die does not disappear into the Ram Guide.

These features have been achieved without sacrificing any of the attributes of earlier types and were developed to meet the increased demand for larger motor driven hammers for all kinds of general forging.

## NAZEL ENGINEERING & MACHINE WORKS

*Manufacturers*

4041-4051 NORTH FIFTH STREET  
PHILADELPHIA, PA., U. S. A.

**ALSO BUILDERS OF THE DILL SLOTTER**



for pipe, fittings, etc., has leased one-story factory at 3899 East Eighty-second Street, and will remove plant to that location, with installation of additional equipment for increased capacity. H. A. Unke is president.

**Home Brewing Co.**, 106 West Third Street, Canton, Ohio, has plans for new four-story and basement plant on West Tuscarawas Street, including brew-house, bottling, mechanical-cooling and other departments, to cost about \$200,000 with equipment. F. F. Bollinger, Ambridge, Pa., is architect.

**City Council, Barnesville, Ohio**, plans installation of pumping machinery and other mechanical equipment for extensions and improvements in municipal water system. Cost about \$110,000 with pipe lines, etc. Jennings & Lawrence, 12 North Third Street, Columbus, Ohio, are consulting engineers.

**K. G. Schmidt Brewing Co., Inc.**, Logansport, Ind., let general contract to Arthur J. Wolfe Co., Logansport, for five additions to plant, including four-story malt and stock building, one-story mechanical bottling plant, two-story storage and distributing unit, one-story power house and one-story loading dock. Cost over \$200,000 with equipment.

**LaPorte Specialties, Inc.**, LaPorte, Ind., has been organized by Tom B. McDonald and Carl H. Kreidler, LaPorte, to manufacture machine products and other mechanical specialties.

## ◀ MICHIGAN DISTRICT ▶

**Fafnir Forge Corp.**, Albion, Mich., recently organized by A. J. Preining and O. J. Crews, has acquired former local plant of Kelsey-Hayes Wheel Corp., and will occupy for new works for manufacture of mechanical products.

**Petoskey Portland Cement Co.**, Petoskey, Mich., has plans for extensions and improvements in mill, to cost about \$25,000 with equipment.

**DeVlieg Milling Machine Co.**, Jackson, Mich., has been organized by Charles B. DeVlieg, 120 West Michigan Avenue, and associates, to manufacture milling machines and other machine tools and parts.

**City Council, Ann Arbor, Mich.**, plans installation of pumping machinery and other mechanical equipment for extensions and improvements in sewage system, costing over \$500,000 with pipe lines and equipment. George H. Sandenburgh is city engineer.

**Jefferson Brewing Co.**, East Jefferson and Dequindre Streets, Detroit, has plans for new multi-story plant, to cost over \$100,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

## ◀ SOUTHWEST ▶

**Southern Brewery Co.**, Tulsa, Okla., recently organized by George S. Ahrens, 515 South Troost Avenue, and associates, capital \$400,000, has plans for modernization and expansion in local building to convert for brewing plant. Equipment will be installed for initial yearly capacity of 90,000 bbl. Cost over \$200,000 with machinery. J. E. Siebel Sons Co., 960 Montana Street, Chicago, is consulting engineer.

**Anheuser-Busch, Inc.**, 721 Pestalozzi Street, St. Louis, plans expansion and improvements in brewing and bottling plant, with installation of new equipment, including tanks, conveyors, etc.; also, boilers and other power equipment. Program estimated to cost over \$1,000,000.

**Prossit Brewing Co.**, St. Louis, recently organized by J. H. Dunn, St. Louis, and associates, has taken over former Kuhn Brewery, Victor, Sidney and Eleventh Streets, and plans expansion and modernization, with installation of brew-house, bottling, mechanical-cooling and other equipment, to cost over \$400,000 with machinery.

**National Pigments & Chemical Co.**, 1 Sidney Street, St. Louis, subsidiary of National Lead Co., 111 Broadway, New York, has arranged for purchase of plant and business of C. P. DeLore Co., Des Peres and Mississippi Rivers, city, and will operate as affiliated interest under name of DeLore Division. Acquired plant will be developed for processing of barium sulphate ore and other raw materials for parent company use, and such operations will be concentrated at DeLore works. C. P. DeLore will be in charge of new division.

**Starr County Water and Improvement District No. 1**, Rio Grande City, Tex., J. H. Guerra, president, plans installation of large electric pumping plant and power station at Roma, Tex., and series of smaller similar plants for new water and irrigation projects. Cost about \$1,200,000 with machinery, pipe lines, etc. Financing is being arranged.

## ◀ BUFFALO DISTRICT ▶

**New York State Electric & Gas Corp.**, South Cayuga Street, Ithaca, N. Y., plans power distributing plant and transmission lines at Claverack, Columbia County, and vicinity. Cost about \$40,000 with equipment.

**Canada Dry Ginger Ale, Inc.**, 122 East Forty-second Street, New York, plans expansion and improvements in plant on Sherbourne Street, Toronto, Ont., with installation of new equipment. Cost over \$175,000 with machinery.

**Niagara Frontier Food Terminal, Inc.**, 1500 Clinton Street, Buffalo, has filed plans for new multi-story addition, for storage and distributing service. Cost about \$80,000 with equipment.

**Buffalo Wire Frame Co.**, Buffalo, has been organized by Ernest Stulik, 56 David Street, and associates, to manufacture wire goods.

## ◀ MIDDLE WEST ▶

**Hoerber Brewing Co.**, Chicago, has acquired former Hoerber brewery at 1617 West Twenty-first Place, 125 x 199 ft., inactive for many years. Plant will be remodeled and improved, with installation of equipment for initial annual capacity of 60,000 bbl. Cost over \$80,000 with machinery. Meyer & Cook, 820 North Michigan Avenue, are architects.

**Illinois Cooperage Mfg. Co.**, 220 South State Street, Chicago, manufacturer of wire-bound kegs, barrels, etc., will carry out expansion and improvement program at branch plant at Minneapolis, rebuilding unit destroyed by fire a number of months ago and installing equipment. Company will also enlarge branch header plant at Aitkin, Minn., with installation of equipment.

**Galesburg Furnace & Foundry Co.**, 557 South Cherry Street, Galesburg, Ill., has been organized by J. B. McNeil and L. C. Struble, to manufacture iron and other metal castings, furnace parts, etc.

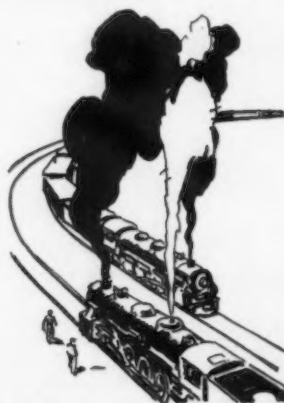
**Common Council, Litchfield, Minn.**, is arranging fund of \$54,850 for extensions and improvements in municipal electric light and power plant, with installation of boiler, accessories and other equipment. Also \$60,000 for extensions and betterments in power and distribution system.

**St. Paul Brewing Co.**, 1800 University Avenue, W. J. Irish, president, has taken over property at location noted and will remodel and equip for new plant, including brew-house, bottling, conveying and other machinery. Cost about \$75,000 with equipment.

**Common Council, Winfield, Iowa**, has been authorized to arrange fund of \$70,000 for new municipal electric light and power plant. Young & Stanley, Inc., Muscatine, Iowa, is consulting engineer.

**United States Gypsum Co.**, 300 West Adams Street, Chicago, has acquired plant and property of Sifo Products Co., 1120 East Seventh Street, St. Paul, Minn., manufacturer of roofing materials, and will consolidate with organization. Plant will be continued as a branch factory.

**Lewis Bolt & Nut Co.**, 504 Malcolm Street, S. E., Minneapolis, manufacturer of bolts, studs, nuts, washers, etc., has awarded general contract to Gunder Roe, 4643 Eighteenth Avenue South, for one-story addition, 30 x 200 ft.



with extension, 13 x 23 ft., to be used in part for storage and distribution.

**Pioneer Iron Works, Inc.**, 1834 West Roosevelt Road, Chicago, has been organized by David Worebow and associates, to operate a general iron and metal works.

**Frontier Brewing Co.**, Belle and Fillmore Streets, St. Paul, Minn., has plans for extensions and improvements, including rebuilding of present three-story unit, installation of new brew-house, bottling and other equipment, and new boiler plant. Cost about \$125,000. Wesley G. Wells, 1455 Edmund Street, is architect.

**Athens Implement & Mfg. Co.**, Athens, Wis., manufacturing paper roll plugs, wood dimension stock and hardwood specialties, has started work on new plant costing about \$50,000 with equipment to replace group wrecked by fire early in August. H. B. Esselman is president.

**Sioux Chief Brewery Co., Inc.**, Sioux Falls, S. D., has plans by Clas & Clas, architects, 759 North Milwaukee Street, Milwaukee, for remodeling former Jones Seed Co. group into brewery with 30,000 sq. ft. Project requires complete high-pressure boiler plant, 75-ton ice machine, five pumping units, 50,000 sq. ft. cork insulation, etc.

**City Clerk, Marshfield, Wis.**, is taking bids for construction of new sewage disposal plant with capacity of 750,000 gal. daily, designed by L. H. Kessler, local engineer.

**Board of Education, Stevens Point, Wis.**, has commissioned Law, Law & Potter, architects, 1 South Pinckney Street, Madison, Wis., to prepare plans for the proposed new high school. Application for \$350,000 loan from R. F. C. has been authorized by Common Council. Paul Hoffmann is president of school board.

**Kurth Malting Co.**, 4302 West Burnham Street, Milwaukee, has placed general contract with Stevens Engineering & Construction Co., St. Louis, for 16-bin and headhouse addition to grain storage at \$80,000.

**DePere Brewing Corp.**, DePere, Wis., will remodel and enlarge plant at cost of \$40,000, including new boilers, pumps, mechanical refrigeration, etc. Project is being handled by Foeller, Schober & Berners, architects, 310 Pine Street, Green Bay, Wis.

## ◀ SOUTH ATLANTIC ▶

**City Ice & Fuel Co.**, 6611 Euclid Avenue, Cleveland, has let general contract to Rodney Miller, Inc., Coral Gables, Fla., for first unit of new brewing plant, adjoining present ice-manufacturing plant, N. W. Thirteenth Street, Miami, Fla. Cost about \$150,000 with equipment. Other units will be built at later date, with total cost approximating \$400,000. Robert E. Cook, 2637 North Miami Avenue, Miami, is engineer.

**City Council, Savannah, Ga.**, plans installation of pumping machinery and other mechanical equipment for extensions and improvements in municipal water and sewage systems. Cost over \$1,000,000. Financing being arranged. Robert & Co., Bona Allen Building, Atlanta, Ga., are consulting engineers.

**Southern Service Co.**, New Smyrna, Fla., will carry out expansion and improvements in ice-manufacturing plant, including installation of equipment. Cost about \$25,000 with machinery. W. T. Britton is superintendent in charge.

## ◀ WASHINGTON DISTRICT ▶

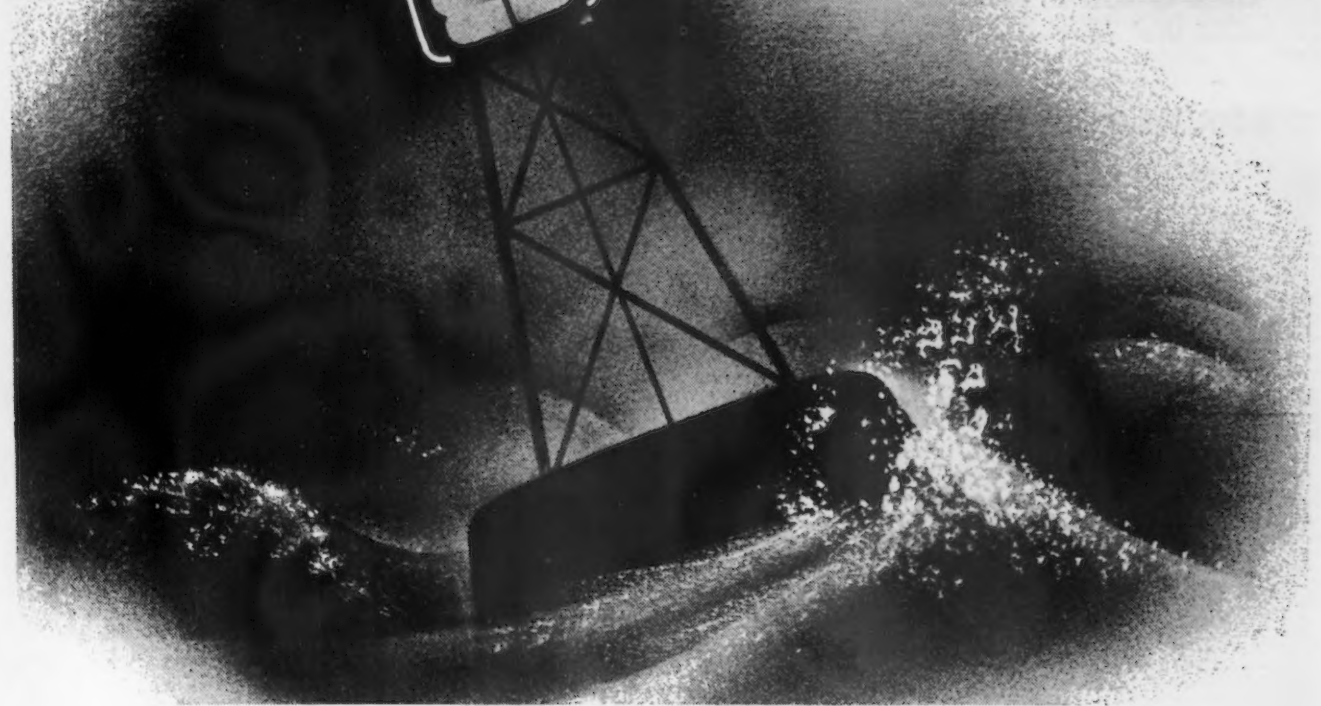
**Frankfort Distillery Co., Inc.**, Columbia Building, Louisville, has let general contract to Maryland Metal Building Co., McComas and Race Streets, Baltimore, for new plant on Cresson Street, Baltimore, consisting of seven one-story units, 73 x 161 ft., 43 x 53 ft., 43 x 65 ft., 15 x 80 ft., 33 x 40 ft., 24 x 40 ft., and 20 x 40 ft., respectively. Cost over \$100,000 with equipment.

**United States Engineer Office**, Navy Building, Washington, asks bids until Sept. 13 for automatic switching and supervisory control equipment for new booster pumping plant. Washington Aqueduct, Washington.

**Procurement Division, Veterans' Administration**, Washington, asks bids until Sept. 11 for one tumbler drier and one underdriven extractor (Proposal 91-M) for institution at Augusta, Ga.

**Chesapeake & Potomac Telephone Co.**, Baltimore, plans line expansion and improvements in Roanoke, Va., district, including installation

# MOLY



## intensifies corrosion resistance in other alloys

MOLYBDENUM is unique in that small amounts of it intensify the desirable characteristics of other alloys. Thus it saves in total alloy costs! Furthermore, it improves many physical properties in iron and steel — always giving a better, and usually cheaper metal, for any definite application.

Take Copper Molybdenum ingot iron for example. It is the best known of all the corrosion resisting irons and steels, being extensively and successfully used to solve problems of atmospheric and mild liquid corrosion. This is because the Moly addition permits a greater copper percentage in solid solution in the iron. In the "18-8" stainless

steels,  $2\frac{1}{2}$  to 4% Moly is being added to increase corrosion resistance. In boiler tubes and heat exchangers, Nickel Molybdenum steel has proved its unusual ability to resist corrosion.

Moly improves any iron or steel — at low cost. It increases machinability, tensile strength, creep strength and resistance to wear. The modern Climax laboratories in Detroit and the Climax metallurgists are prepared to show you how. Tell us your problems. Ask for details about our free engineering and experimental services and an important new book: "Molybdenum, 1933." Climax Molybdenum Company, 295 Madison Avenue, New York City.

VISIT THE CLIMAX BOOTH—No. 49—AT THE NATIONAL METAL CONGRESS

# CLIMAX Mo-lyb-den-um

of underground cables, conduits, etc., to cost about \$75,000.

**United States Coast Guard Headquarters,** Washington, asks bids until Sept. 11 for lots of 50 to 100 3-gal. fresh water containers of stainless steel or monel metal for Curtis Bay, Md.

**Bureau of Supplies and Accounts, Navy Department,** Washington, asks bids until Sept. 12 for ten hand-operated portable cable cutters (Schedule 656) for Lakehurst, N. J., Naval Station; quantity of black and galvanized medium plate steel (Schedule 567-R), one electric underhung, 2-ton capacity, bridge traveling crane, complete with runway conductors (Schedule 584) for Eastern and Western Navy Yards; for 30,000 lb. manganese bronze (Schedule 669) for Norfolk, Va., Navy Yard; until Sept. 15 for 19,888 lb. copper nickel alloy forgings, and 88 machine finished plungers (Schedule 667-R) for Washington Navy Yard.

## ◀ SOUTH CENTRAL ▶

**Kentucky Brewing Co.,** Fifteenth and Hill Streets, Louisville, let general contract to National Concrete Construction Co., 3010 West Broadway, for new five-story plant, 70 x 180 ft., with one-story bottling works, and power house. Cost about \$275,000 with equipment. Frank H. Lanham is president. Walter C. Wagner, Louisville, is architect.

**Southern Industries & Utilities, Inc.,** W. G. Waldo, National Press Building, Washington, president, plans construction of hydroelectric power plant on Lower Tennessee River, Caloway County, Ky., about 50 miles from Paducah, Ky. Entire project estimated to cost over \$500,000 with transmission lines, power substations, switching stations, etc. Application made for permission.

**East Baton Rouge Waterworks,** District No. 1, East Baton Rouge, La., plans installation of two motor-driven centrifugal pumping units, one gas engine-driven centrifugal pump, and complete accessories for capacity of 3000-gal. per min., and other mechanical equipment for new waterworks system. Cost about \$35,000. L. J. Voorhies, Baton Rouge, is consulting engineer.

**Taylor & Williams, Inc.,** Norton Building, Louisville, has plans for new distilling plant on 20-acre tract of land, consisting of group of one-story units, with power house, machine shop, and other mechanical structures. Cost over \$200,000 with equipment.

**Standard Brewing Co.,** South Johnson Street, New Orleans, has let general contract to O. F. Harang Co., 6008 Catina Street, for two-story plant unit, 60 x 100 ft., to cost about \$75,000 with equipment. J. J. Lagarde, Maritime Building, is architect.

**Common Council, Selmer, Tenn.,** asks bids until Sept. 14, for pumping machinery and other mechanical equipment for new municipal waterworks and sewage system. Thomas H. Allen, Memphis, Tenn., is consulting engineer.

## ◀ PACIFIC COAST ▶

**Woodbridge Winery, Inc.,** Oliver Ziegler, 622 Seventeenth Street, Sacramento, Cal., president, soon takes bids on general contract for new plant in vicinity of Lodi, Cal., comprising three main one-story units, power house and machine shop, to cost about \$100,000 with equipment.

**Carbon Products Co.,** Riverside, Cal., S. L. Herrick, general manager, plans new one-story plant for manufacture of hard carbon products, to cost about \$30,000 with equipment.

**Southwestern Brewing Co.,** 402 Consolidated National Bank Building, Tucson, Ariz., J. P. Keiser, secretary-treasurer, is completing plans for new multi-story plant, to be equipped for initial annual capacity of 30,000 bbl. Cost over \$125,000 with equipment. Roy Place, 11 East Pennington Street, is architect.

**Harbor Boat Building Co.,** Los Angeles, care of Hansen & Sweeney, 425 Title Insurance Building, representative, has been organized by John and Myles Rados, and J. D. Hamilton, all of San Pedro, capital \$200,000, to operate boat-building and repair works at San Pedro Harbor.

**Libby, McNeill & Libby,** 60 California Street, San Francisco, have authorized rebuilding of canning plant at Taku, Alaska, recently destroyed by fire, to cost about \$100,000 with machinery.

**Bureau of Supplies and Accounts, Navy Department,** Washington, asks bids until Sept. 12 for 15,600 ft. phosphor bronze wire rope, and 90,000 ft. plow steel wire rope (Schedule 622), 1430 lb. copper nickel alloy bar (Schedule 607), four exhaust evaporator boilers and spare parts (Schedule 571), 11,000 lb. corrosion resisting steel (Schedule 606) for Mare Island, Cal., Navy Yard.

## ◀ FOREIGN ▶

**Municipal Government, Prague, Czechoslovakia,** has plans for new civic airport at Ruzyn, suburb of city, with hangars, repair and reconditioning shops, oil storage and distributing buildings, and other field structures to handle 150 airplanes daily. Cost over \$300,000 with equipment.

**Department of Public Works and Tenders, Wellington, New Zealand,** asks bids until Sept. 26 for two 25-ton and one 30-ton overhead traveling cranes and complete accessories.

**Sabinas Brewery, Ltd.,** Sabinas, Coahuila, Mexico, soon begins superstructure for new one, two and three-story branch plant on Simpson Street, San Antonio, Tex., to include brew-house, bottling works, power house and other units. Contract for foundations let to Hill & Combs, 307 Vance Jackson Road, city. Cost about \$250,000 with equipment. Matthews & Kenan, Smith-Young Tower, city, are architects.

**British Coal Refining Processes, Ltd.,** London, England, has plans for new coal carbonization plant at Huddersfield, England, consisting of several units with power plant, machine shop and other mechanical departments. Cost over \$400,000 with equipment. Proposed to construct other similar plants in coal mining districts of country.

## TRADE PUBLICATIONS

**Vertical Motors—Wagner Electric Corp.,** St. Louis. Bulletin devoted to three different types of vertical motors. Applications are illustrated.

**Industrial Furnaces—W. S. Rockwell Co.,** 50 Church Street, New York. Bulletin featuring the company's razor blade furnace for continuous hardening, coloring and tempering razor blade strip. Furnaces may be electrically heated or gas-fired.

**Testing Equipment—General Electric Co.,** Schenectady, N. Y. Bulletin describing and illustrating the company's portable high-voltage testing sets, high-current testing transformer and regulator and induction voltage regulators.

**Blowers.—Roots—Connersville—Wilbraham,** Connersville, Ind. Bulletin 21-B16 describing and illustrating Victor-Acme type SB and type AFS blowers. About 30 uses and applications are listed, and capacities at listed pressures and speeds are also given.

**Methane Detectors—Mine Safety Appliance Co.,** Pittsburgh. Circular devoted to M. S. A. equipment for quickly and accurately detecting

methane content in mine air. Operating principle of the instrument is shown.

**Wire Rope—A. Leschen & Sons Rope Co.,** St. Louis. Second revised edition of booklet entitled "Practical Information on the Use and Care of Wire Rope," including unloading and moving, storage, kinks and kinking, lubrication, stresses, binding ends, splicing and other valuable information.

## ▲▲ TRADE NOTES ▲▲

**Alliance Machinery Exchange,** 218 Centre Street, New York, has purchased building at 206 Centre Street for a warehouse and salesroom.

**Kron Co.,** Bridgeport, Conn., manufacturer of industrial dial scales, has appointed the following distributors to handle its complete line of equipment: Equipment Engineering Co., New Haven, Conn., R. S. Kerr & Co., Atlanta, Ga., and Equipment Engineering Co., Indianapolis.

**Cedarburg Mfg. Co.,** Cedarburg, Wis., recently acquired the property and patents of the American Electric Motor Co., formerly a subsidiary of Splittdorf-Bethlehem Electric Co., Newark, N. J., and will continue to manufacture removable stator, moisture and dirt-proof, and ventilated motors in sizes ranging from 1/2 to 30 hp.

**Homestead Valve Mfg. Co., Inc.,** Coraopolis, Pa., manufacturer of vapor spray machines for automotive, industrial, aeronautical and building cleaning, has appointed F. J. Evans Engineering Co., 1305 Watts Building, Birmingham, as exclusive representative in Alabama.

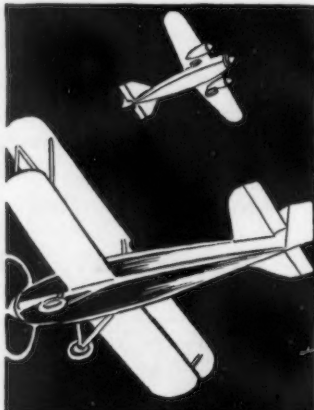
**Mills Co.,** Cleveland, maker of metal partitions, unit showers and hospital cubicles, has named Building Products Corp., 1425 Welton St., Denver, Colo., as sales representative for Colorado.

**Superior Steel Corp.,** Pittsburgh, has removed its general eastern sales office to 2002 Girard Trust Building, 1400 South Penn Square, Philadelphia.

## July Coke Production Was 21 Per Cent Over June

FOR the third consecutive month production of coke has increased over the preceding month, according to the data of the Bureau of Mines. Output of both beehive and by-product coke during July totaled \$2,865,716 tons, an average of 92,972 tons a working day and a 21.3 per cent increase over June.

Production of by-product coke at 90,236 tons a day was the highest since May, 1931, and represented a 20.8 per cent increase over June. One long-idle plant resumed operation during July bringing the number of active plants now in operation to 83. Beehive coke output increased 42 per cent over the June level and averaged 2736 tons a day. Coke stocks at by-product plants decreased 100,460 tons to 2,846,408 tons. Merchant plants increased their stock piles 4.5 per cent. Visible stocks at the month's end were equivalent to 31.5 days' production at the current rate.



# When will the railroads start buying?

**W**ITHIN the last three months evidence has appeared of some improvement in the railroad equipment industry, together with expanded railroad traffic and increased earnings.

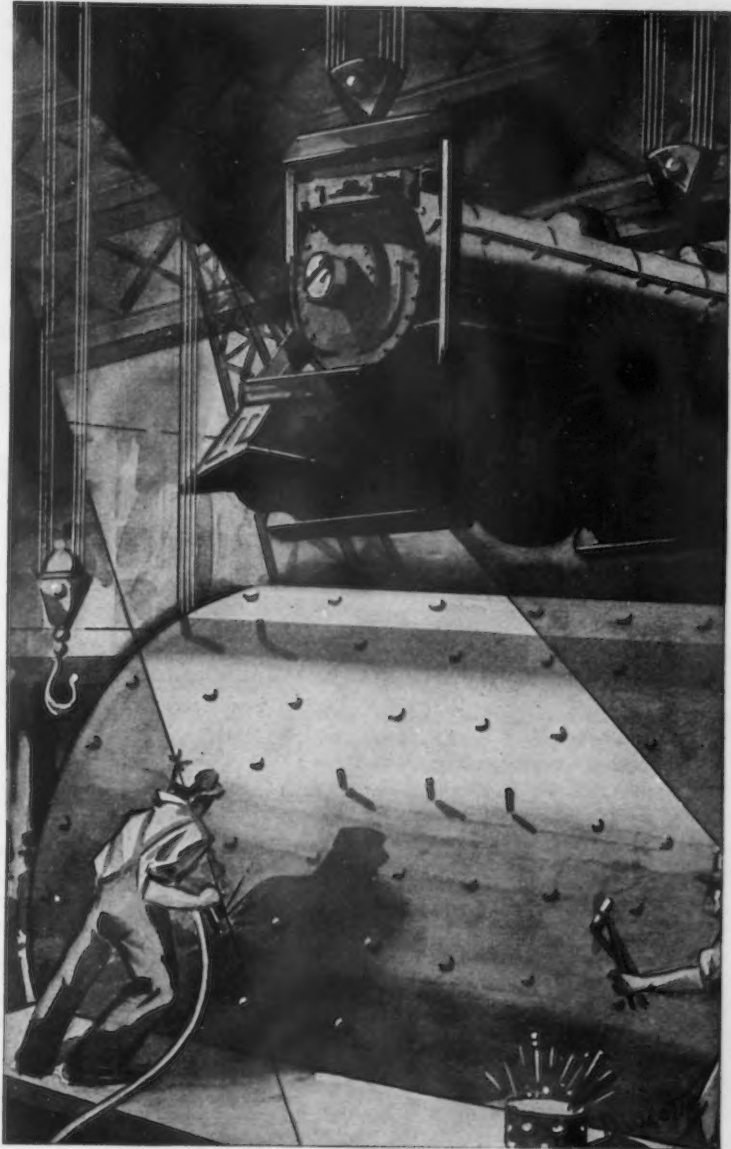
In July alone orders for 13 locomotives were placed, against only one for all of 1932. Orders for freight cars in the first seven months of 1933 totaled 872 against 384 in last year's like period.

New purchases are not surprising, in view of the condition of existing equipment. In July, 15.4 per cent of the freight cars and 22.2 per cent of the locomotives were reported in a bad state of repair. Bad order freight cars are estimated at nearly double the total of two years ago.

Meanwhile carloadings have expanded impressively. The total from May to the first week of August was 8,124,000 against 6,968,000 for the same time in 1932.

Earnings have shown remarkable power of recuperation, the net operating income for second quarter of 1933 being \$119,000,000, against \$43,000,000 one year ago.

The Interlake Iron Corp. is a supplier of pig iron and foundry coke to leading makers of railway equipment.



## INTERLAKE IRON CORPORATION

PIG IRON - COKE

PLANTS—CHICAGO . DULUTH . TOLEDO . ERIE

PICKANDS, MATHER & COMPANY, Sales Agents

CLEVELAND . CHICAGO . DETROIT . ERIE . TOLEDO . MINNEAPOLIS . DULUTH

## The Farmer Sees a Way Out

(Concluded from Page 25)

of thousands of farmers own only small tracts of land have led the implement trade to introduce small units modestly priced to supplement their regular lines. This should bring in considerable new business.

Finally, the agricultural implement industry is cautious about forecasting its activities over the coming months, because of the many uncertain factors involved, but it is a unit in its opinion that sales will be better than they have been. The wire goods people are of the same mind. So are the automobile manufacturers. And all of these lines are heavy users of steel. Naturally, conditions are bound to be spotty, with some sections of the country in better shape than others because of variance in crops. This was true even in the most prosperous years. Many problems are yet to be worked out, and whether they will be successfully

solved within a reasonable time is a matter of speculation.

However, one cannot get away from the fact that the farmer is in a relatively cheerful frame of mind for the first time in years. He sees the Government hard at work in his behalf. Even though its plan may not be the ideal solution, it has a plan and is executing it, and it already has put money into the farmer's pocket if he happens to be a grain farmer or cotton grower. It is extending its ideas as applied to grain into livestock and the Government, through the NRA, is putting into effect a gigantic experiment to increase purchasing power to buy farm products.

Is it surprising, therefore, that the farmer is feeling better, that he already is beginning to buy a new automobile and other articles and that he will likely be a good prospect for new farm equipment next spring? At last he sees a way out.

## Special Properties and Applications of Beryllium-Copper Alloys

(Concluded from Page 19)

quirements. Their use involves no hazard from sparking.

Another advantage of such tools is that it is possible to make wrenches to the same dimensions as used for steel and at the same time have a non-ferrous material which will hold its shape under usual tool stresses. The tensile strength can range from 155,000 to 180,000 lb. per sq. in., hardened after cold working, with a Brinell hardness of 325 to 375.

### Steel Cut With Chisels of the Alloy

Cold chisels are being made which cut steel. As an illustration, a chisel was tested and the following results obtained: First, it cut off the head of three  $\frac{1}{4}$ -in. rivets using a 1-lb. hammer, with no damage to the chisel. Second, it sheared off a section 3 in. long of  $\frac{1}{8}$ -in. thick cold-rolled steel, using a 1-lb. hammer, with the chisel undamaged. Third, it was tried for cutting a surface groove in 1-in. wrought iron pipe using the corner of the chisel; a cut about 1 in. long was made with a flattening over of the corner of the chisel. Fourth, using the undamaged portion of the edge, the chisel was driven endwise through the wall of this same 1-in. wrought iron pipe, slitting the pipe

down for a distance of 1.5 in., with no damage to the chisel. The thickness of the pipe wall was 0.140 in.

### Bearing Sleeves for Airplane Propellers

An interesting application of castings of 2.50 per cent beryllium-copper is in special bearing sleeves used in new Hamilton adjustable-pitch propellers. The bearing provides a satisfactory base to take care of the relative motion between the two parts without any sticking or scuffing. With a Brinell hardness of about 400, it is possible to machine these successfully after being precipitation hardened. This development is believed to forecast other important applications when a hard, hard-wearing, non-ferrous metal is desired.

Cams of cast beryllium-copper alloys have replaced, with longer life, certain parts in large machines used by a large can company for making tin cans. A 1.75 per cent beryllium-copper cam was substituted for one of cast iron. The beryllium-copper cams lasted over nine months as against a short life for those of iron.

A drop forge company in the Middle West has successfully solved the problem of drop forging these new

alloys. Die casting of the new material is predicted as possible.

The whole field of beryllium-copper products is in its infancy. With small additions of other alloys to overcome microstructural irregularities and the further study of heat treatment conditions, new properties and new uses are probable.

## Motor Wheel Corp. to Make Steel Beer Barrel

THE Motor Wheel Corp. has remodeled one of its Lansing, Mich., plants and installed new equipment to produce the steel beer barrel illustrated, which is being merchandized under the name of "Duo-Steel." This container is of double-wall type, with a complete inner and outer shell, the



inner shell being built up of two half ovals welded at the belt, and air tested before it is incased in the outer barrel. It is stated that this construction assures freedom from leaks in the inner shell, and that the principles of truss action embodied in the design of the barrel assures freedom from distortion under impact.

## TRADE PUBLICATIONS

Pumps.—Morris Machine Works, Baldwinville, N. Y. Improvements in its side suction volute pumps are described and illustrated in Bulletin 149. Pumps are built in sizes from 1 to 20 in. for capacities up to 14,000 gal. per min. at heads up to 120 ft. and are available in horizontal and vertical types, with motor, steam engine, gasoline engine or belt drive. They are offered for handling clear water and abrasives or pulpy mixtures.



## Suiting the Metal to the Job is LIKE HANDLING HIGH-STRUNG PEOPLE!

**L**IKE musicians, artists and poets, major Nickel Silver jobs have their "peculiarities." Recognizing this and more accurately fitting the metal to the job may side-step endless trouble. Some jobs differ greatly, some only slightly—but *all* vary enough to deserve special attention. A few examples will bring this out:

**HOLLOW WARE STOCK**, for instance, must arrive at the fabricator's with a surface condition and grain structure perfect enough to take a high polish without further treatment. It must also have the ductility to form well *with* the temper to stand up in use.

**FLAT WARE STOCK** takes severe punishment in cross and grade rolling. It must have uniform ductility, even temper and no brittleness.

**KEY BLANK STOCK**, highly "temperamental," calls for an accurate balance between

temper for strength and full leaded content for rapid workability.

**SLIDE FASTENER STOCK** for luggage must bear the heavy strain of overpacking; for clothing it must withstand body acid and laundry wear. Workability, strength, toughness and fine appearance are important factors.

**ETCHING METAL**, for clock dials, signs, name plates, etc., necessitates almost uncanny control of grain structure to make possible the many art surfaces in vogue.

For years we have been helping fabricators to get the right metal for the job. Wherever a customer has explained the nature of the work to be done, he has usually profited by our suggestions. Have you a Nickel Silver job in the works now that is a bit "ailing"? If so, tell us the symptoms and we will gladly prescribe!



THE SEYMOUR MANUFACTURING CO., 24 FRANKLIN ST., SEYMOUR, CONN.

# SEYMOUR

SHEETS, WIRE, RODS

## NICKEL SILVER

ALSO: PHOSPHOR BRONZE SHEETS, WIRE, RODS : AND NICKEL ANODES

# Putting the Question Mark to Work

(Concluded from Page 22)

interrupted quenching, as is common practice with high-speed steel tools that are prequenched at 1100 deg. F. before the oil quench. Interrupted quenching is practical with some of the chrome-nickel and chrome-nickel-tungsten alloy steels, which we find can advantageously be held at a temperature of 430 deg. F. before the oil quench. For parts that are to be tempered after hardening, distortion may be prevented by placing the pieces in the tempering bath immediately after quenching. To sum this up, we find that one way to avoid warping is to slow down the quenching as much as possible so as to avoid differential shrinkage in the pieces of complicated cross-section.

Bellis Heat Treating Co.

## A Salt Water Alloy

*We desire to use aluminum castings below the water line on salt water vessels. We understand ordinary aluminum will corrode. Can you tell us of any simple way of preventing this corrosion?*

New England Steel Rack Co.

**A**LUMINUM alloy castings like most other castings are subject to various degrees of attack by salt water. This attack may be minimized and in many cases prevented by proper selection of alloy and by the use of insulation and protection.

Among the aluminum alloys three general groups, aluminum silicon, aluminum magnesium, and aluminum manganese are important because of their corrosion-resisting properties. There are some alloys in the aluminum-silicon group which possess excellent casting characteristics, which are heat treatable, and which have good resistance to salt water corrosion. Some of the aluminum-magnesium alloys possess better corrosion-resisting properties but are less satisfactory in casting characteristics. Certain aluminum-magnesium alloys are almost wholly unaffected by salt water but are limited in use because of casting difficulties.

In assembling metal parts for exposure to sea water, it is important to insulate different metals to prevent electrolytic action. This may be done by use of non-metallic gaskets or insulating paint.

Another important consideration is surface protection. Surfaces should be thoroughly cleaned. Castings should be primed with a suitable primer immediately after cleaning, taking into account the fact that the surface should be thoroughly dry. An aluminum pigmented long-oil spar varnish provides a satisfactory top coating material for marine work. If other colors are desired, pigmented linseed oil, tung oil, bakelite or syn-

thetic resin varnishes may be used. In severe cases, particularly where parts are to stand undisturbed for any period in barnacle-infested water, some type of anti-fouling composition should be used as a final coating.

Aluminum Co. of America.

## Painting Marine Castings

*What precautions should be taken to protect metal parts in marine construction?*

A. J. A.

**W**HEREVER feasible, protective coverings may be applied. Canvas or linen thoroughly impregnated with bituminous compounds, marine glue or marine varnishes, offer excellent protection for long periods of time. If such fabric coatings are out of the question, care in the application of paint or varnish will give good results. The efficiency of any such coating is dependent upon its close adherence to the surface and this is dependent upon the preliminary surface treatment. Marine engineers specify careful preliminary cleaning and treatment of surface prior to painting. The removal of grease and dirt is usually accomplished with suitable solvents or non-alkaline commercial cleaners. Strong acids or alkalis should not be used on porous castings because of the difficulty of thoroughly removing such solutions from the pores. Sand blasting is frequently used as a preliminary treatment, the roughing of the surface providing additional adherence for the protective coating. After cleaning, a suitable primer is applied as soon as the surfaces are thoroughly dry. Many commercial primers are offered. Bakelite and synthetic resin varnishes have given satisfaction. Zinc chromate primers are also used extensively. After the primer, a first-class spar varnish will serve as an excellent top coating, although almost any good grade of marine paint will be satisfactory.

H. J. R.

## Electric Furnaces for Cast Iron

*We would like to know whether it is practical to use an electric furnace for cast iron. Are there any companies successful with such a furnace?*

S. R. H.

**O**NE foundry using a 1000-lb. electric furnace has succeeded in securing some remarkable results in new cast iron qualities. For example, this foundry is now making cast iron dies for an automobile body manufacturer, which dies are replacing former steel castings. Ordinary cast iron had insufficient strength and shock re-

sistance. However, the new electric furnace product is a die metal which machines readily and costs less than the steel dies. Electric furnace cast iron is also used successfully in the production of laps for finishing gears. In one case the new laps have shown a life of from 500 to 1000 gears each, in contrast to a life of from 50 to 100 gears for the old laps.

C. H. Morken, Foundry Engineer,  
Detroit Electric Furnace Co.

## Annealing Saw Strip

*We are having difficulty annealing and rolling a metal saw strip of the following analysis: Carbon 1.20 to 1.30, chromium 0.50, and tungsten 2.50 to 3.00 per cent. We would be pleased to have some suggestions as to annealing temperature and method of cold rolling, also as to a method of preventing decarbonization of the surface.*

E. Bonner.

**W**HILE we lack experience with the exact analysis referred to, we have done considerable work with a similar alloy having the following analysis: Carbon 1.25 to 1.35, chromium 0.40 to 0.55, and tungsten 3.00 to 3.25 per cent. We find that this alloy should be quenched in water between 1500 and 1525 deg. F. The annealing temperature is 1450 deg. F. and we find it necessary to pack material for annealing in order to avoid excessive decarburization. We find it best to pack the material in a mixture of flake mica and about 25 per cent of pulverized coke. The pieces are packed in a tube or box and joints are tightly sealed with clay to exclude air or furnace gases. This material does not lend itself to cold rolling to any great extent, as it work-hardens rapidly and tends to fracture if the cold rolling is carried very far. Our experience with this steel indicates that after quenching, a hardness of about 67 Rockwell is developed, and after drawing to 600, the hardness is reduced to about 62 Rockwell.

Joseph T. Ryerson & Son, Inc.

## Wood Grain on Metal

*Can you tell us how wood grain designs are transferred to metal and plastic material?*

Adler Metal Products Corp.

**O**NE method is to first etch the wood with a mild acid, then paint it with mahogany or other desirable color. After this, a rubber roll about 24 in. to 30 in. in diameter and as wide as the metal to be coated, is rolled over the etched board and then on to the metal. In this way it transfers the exact wood grain to the surface of the metal.

Mattice Engineering Co.



For sound  
dense forgings



## SPECIAL HIGH GRADE FORGING BILLETS

**SOUND**, dense billets that produce forgings of maximum strength are the natural result of Andrews' methods—absolute control of raw materials, excellent metallurgical supervision, rigid inspection, liberal discard at the shears, and thorough chipping.

You're sure of the quality of your forging steel when you insist on ASCO Forging Billets.

Our metallurgical laboratories are at your service in developing special steels for special purposes.

**The ANDREWS STEEL CO.**

NEWPORT

KENTUCKY

Carbon  
Chrome  
Chrome Molybdenum  
Chrome Nickel  
Chrome Vanadium

Molybdenum  
Nickel  
Nickel Molybdenum  
Vanadium Billets and Slabs

## A GOOD WORKER



## THIS SMALL CRAWLER

Within its 7½ ton capacity rating, the No. 1 Industrial Brownhoist is unsurpassed for handling materials. As a crane, this machine may be equipped with a 30 to 40 foot boom and is readily convertible to a shovel.

The No. 1 is one of four sizes of Industrial Brownhoist crawlers, ranging from 6¼ to 20 tons capacity. All four are described and shown at work in our Booklet 321. Would you like us to send you a copy?

**INDUSTRIAL BROWNHOIST CORPORATION**

GENERAL OFFICES: BAY CITY, MICHIGAN

District Offices:

New York, Philadelphia, Chicago, Cleveland

Gentlemen:

Please send us a copy of your Booklet 321, describing Industrial Brownhoist Crawler Cranes and Shovels.

Company

Individual

Address

# INDUSTRIAL BROWNHOIST

# JUST BETWEEN US TWO

## Hail, Jan Bata of Zlin!

We see by the papers that Jan Bata, head of the world's largest shoe factory at Zlin, Czechoslovakia, is here visiting the big show in Chicago.

Herr, Monsieur, Signor (or whatever is Czechoslovakian for mister) Bata is one of the family, as his company has been getting The Iron Age for y'ars and y'ars. In case you see this, Mr. Bata, and want to repay us for the ad, we park our aristocratic dogs in a 10½-E, with plenty of room for that bunion on the big joint of the right big toe.

But to get back to business, most of the reigning business houses of Europe are members of The Iron Age family. Let's see, there's Fiat and Krupp and Citroen and Metropolitan-Vickers and Balfour and Tata and Mitsui and Minerva and Renault and Baldwin's and Michelin, to mention a few of them.

## He Picked Runners-Up

A wily old German, head of a prosperous machinery-building business and a highly successful advertiser, was telling how he picked the best publication in a given field.

After listening to an advertising solicitation, he would say, "You claim your paper is the leader. What's the second best paper?" He would ask that question of the representatives of all competing publications.

Agreement as to which was the second best was almost always close to unanimous. Then he would place his advertising in that paper which competitors agreed, next to their own, was the best.

To represent him in the metal-working field he always used The Iron Age. While this is a far better scheme of medium-selection than the eeny-meeny-miny-moe method, we favor the 100%-accurate, foolproof plan of sending a questionnaire to a given list of customers, asking, "Which paper do you prefer?"

We have a soft spot in our heart for that plan, because when it is employed, The Iron Age usually breasts the tape by a comfortable margin.

## Music to Our Ears

The supervising engineer of a company making a device that adorns the desks of men who avoid the distracting influence of silken-clad calves writes:

*"... of all the technical magazines that come into the plant I read yours at least as thoroughly, and possibly more thoroughly, than any other one."*

## He Thought He Missed the Hawk

When the Order of the Blue Eagle was pinned on us we took it sort of nonchalantly, just as we did when notified of our election to the National Geographic Society. We stuck one of those ornate red and blue posters on the bulletin board near the elevators so the visiting salesmen would know they wouldn't have to do any price-chiseling to sell us.

As a second thought we put a little blue eagle on the editorial contents page, not thinking anyone would notice it, for you see so many blue eagles these days that it is hard to keep track of them.

But at least one of our readers is blue-eagle-conscious, as we advertising men of the dear dead '20s would have said had the eagle been an eaglet then. For, on a certain call made a few days ago, a reader fixed a suspicious eye on us and said, "I didn't notice the hawk in the paper this week." He acted as if he thought we were playing fast and loose with the bird, and acted real cold until we showed him our feathered pet roosting comfortably on page five.

—A. H. D.

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Instant—Accurate—Visible Readings

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# THE IRON AGE

DUCTION -- MANAGEMENT SEPTEMBER 14, 1933

PROCESSES -- NEWS

## REPUBLIC

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CENTRAL ALLOY DIVISION . . . MASSILLON, OHIO  
**REPUBLIC STEEL CORPORATION**  
GENERAL OFFICES  YOUNGSTOWN, OHIO

# WHY PAY THE PRICE OF INDIFFERENCE



## "I'M TELLING YOU... THEY EXPECT MIRACLES"

**H**AVING "reject" trouble? Many plants are. Factory after factory long sobbing over sales are amazed to find that the first business upswing leaves them sobbing over production.

Possibly machines are obsolete . . . workmen not in tempo . . . organization lacking. On the other hand, it may be something simpler, though just as costly. Possibly your plant, too, is merely paying the price of indifference toward Motor Control.

Motor Control can easily disrupt production because it is the one link between human intelligence and motorized machines. It has a bearing on the speed and dependability of production, the quality of workmanship, the cost of power and maintenance, the safety of men, motors and machines.

If your plant has come to judge the importance of Motor Control by its cost or size rather than by its function, act now to prevent further losses. Ask C-H engineers to survey your operations. Specify Cutler-Hammer Motor Control for all new motors or motorized machines. Motor builders recommend Cutler-Hammer. Leading machinery builders feature it. Electrical wholesalers stock C-H Motor Control and Safety Switches for your convenience. **CUTLER-HAMMER, Inc., Pioneer Manufacturers of Electric Control Apparatus, 1325 St. Paul Ave., Milwaukee, Wis.**



### Now is the Time to Know

*As the business curve rises, economies made now will swell to amazing totals. If your plant is sacrificing profits, is inclined to doubt the savings possible in modernizing Motor Control, make a test case of one machine or one department as an object lesson. Call in a C-H engineer. Judge only by results.*



# CUTLER HAMMER

**The Control Equipment Good Electric Motors Deserve**

# ▲▲ THE IRON AGE ▲▲ September 14, 1933 ▲▲

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